December 29, 1958

Paper Trade Journal

Swedish Mill Pioneers Kamyr Digester for NSSC Pulping

Outlook for '59 in Paper and Board—'58 Reviewed

Synthetic Fibers Improve Map Paper Characteristics

New Process Outlined for ClO, Manufacture

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REMEMBER THESE DATES

Jan. 28-30, 1959: Canadian Pulp and Paper Assn. Annual Meeting, Queen Elizabeth Hotel, Montreal

Feb. 23-26, 1959: Paper Week in New York

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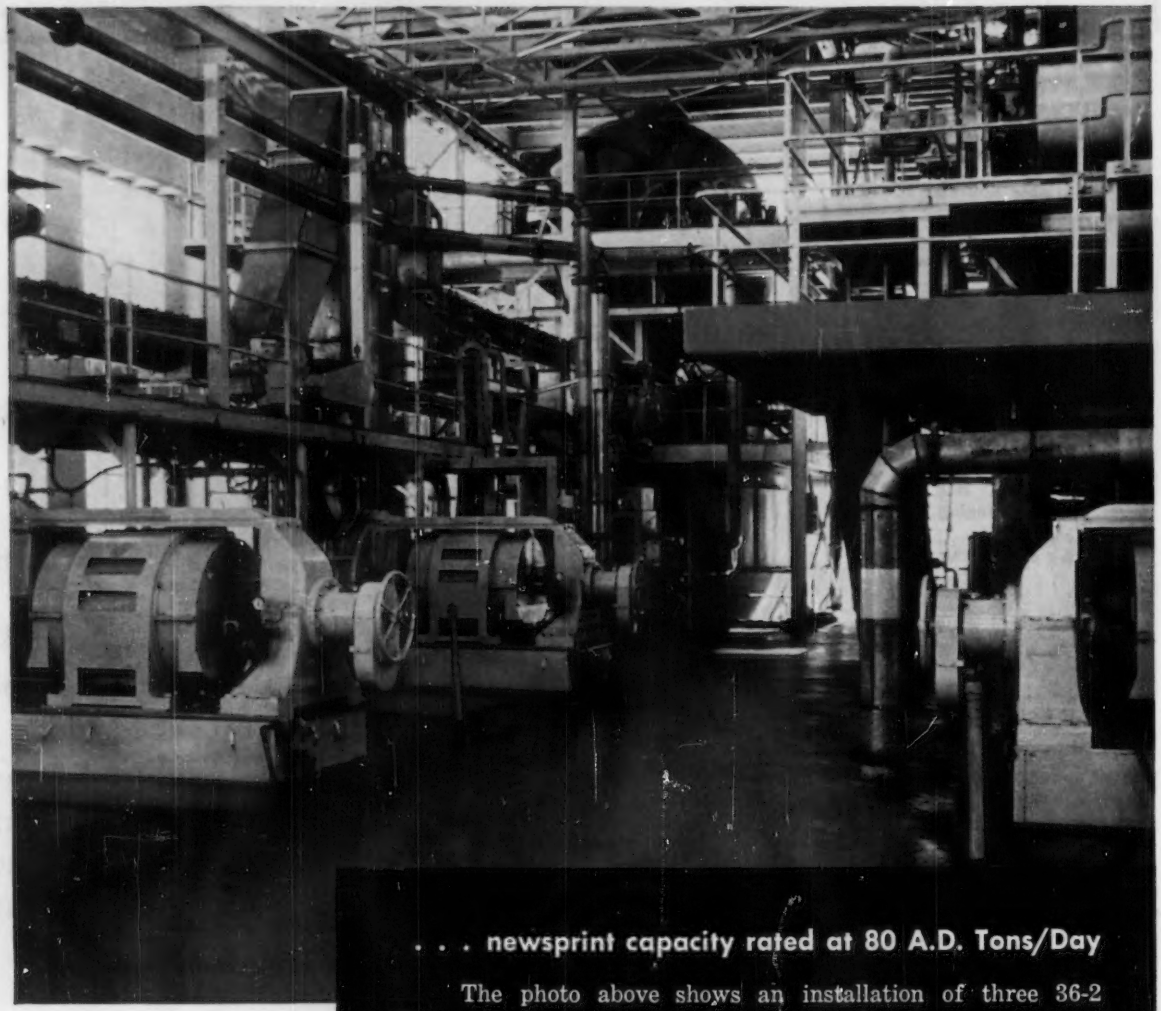

. . . newsprint capacity rated at 80 A.D. Tons/Day

The photo above shows an installation of three 36-2 "Sprouts" producing 40 A.D. tons/day of cold caustic pulp at the modern Australian Newsprint mill. Three additional precision-built, Sprout-Waldron Refiners have since been installed to bring the capacity up to 80 A.D. tons/day.

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REPRINTS AVAILABLE

The full story of this Australian Newsprint installation is being published by the Australian Pulp and Paper Industry Technical Association (A. P. P. I. T. A.). We intend to reprint it in Better Fibers. A note on your letterhead will reserve your copy.

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Trends

Paper and Board in December

Paper and board mills during the first three weeks of December operated at about the same rate or slightly above that of the same period last year. However the increase in capacity in the ensuing year means that the December tonnage this year was considerably higher.

Pulp Prices Unchanged For First Quarter

As predicted in this column a month ago. there will be no changes in the officially quoted pulp prices for the first quarter of 1959, compared with this year. However we understand that there is still some price chiseling under the guise of off-substandard or offgrade pulp, although this is not as prevalent as earlier this year.

Excess Newsprint Capacity Thru 1962

The western world will have a reserve of newsprint capacity for a few years, states the Newsprint Ass'n. of Canada in its annual statistical report just issued, entitled "Newsprint 1958." 1959 capacity will be large enough to meet the free world's demand which is projected for 1962, while running at an operating rate of just over 90%. The association estimates that world newsprint demand in 1959 will exceed 14.2 million tons, a new annual record.

Newspaper Strike Affects Wast Paper Market

The protracted newspaper strike in New York is affecting the waste paper market, at least in the New York area. Number one news is in very short supply. The mills will probably not feel the pinch until after the holidays. If the strike is not concluded before then prices of this grade may experience a steep rise. We have been unable to find any definite correlation between this situation and the unusual mid-month price rise in the Chicago waste paper market, for number one news.

Canadian Pulp Imports Up

Canadian shipments of pulp to the United States in October this year were 17% higher than in the same month in 1957.

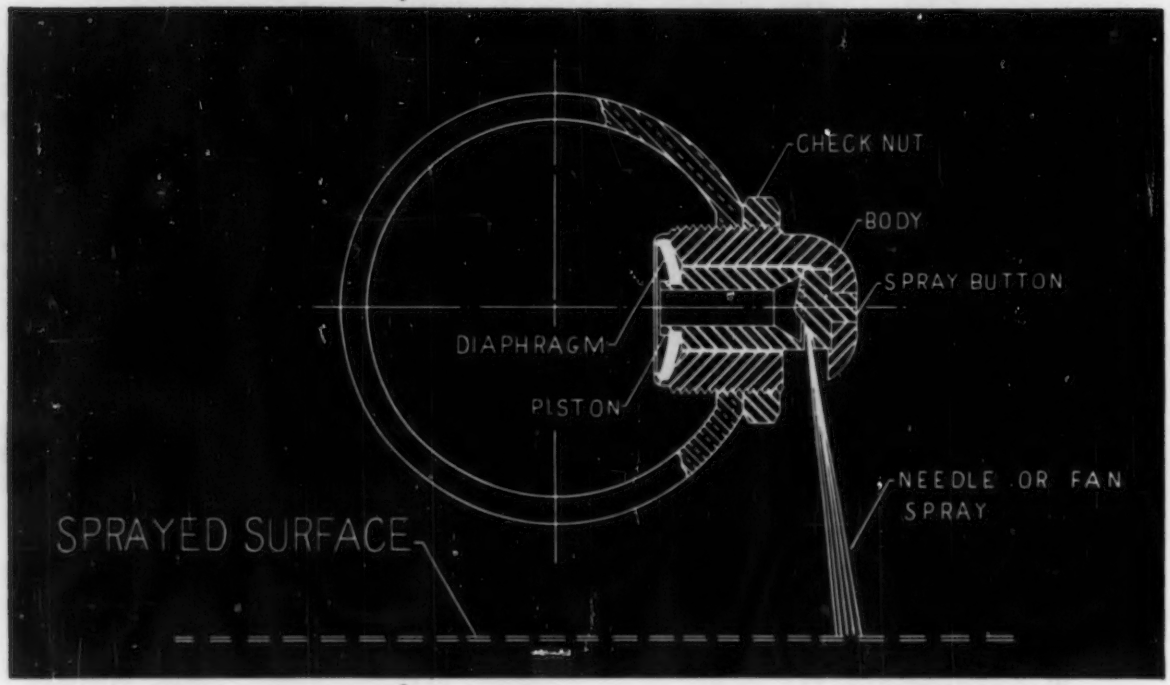
'58 Corrugated Box Production Even With '57

Production of corrugated boxes for the first fifty weeks of 1958 was so close to the figure for the same period in 1957 that it is impossible to state which is ahead with any degree of accuracy.

Waste Paper Outlook For Next Year

Additional waste paper stock collections and packing facilities must soon be provided to keep pace with growing consumption says R. H. Hagey, president, NAWMD Paper Stock Institute of America in a year end statement. Mr. Hagey made the following comments with regard to grades—Board and building industry grades, very favorable outlook—Book and ledger grades are nearing the point of undersupply, due to high costs of sorting, shipping, etc. Mills dependent on these grades must pay higher prices to increase the production or use more pulp—Direct pulp substitute grades show excellent balance between supply and demand.

Basic design of the Lodding Nozzle in operation. Large, clear passages bring the white water up to the shaping parts. Small particles if lodged cause piston to oscillate and free them.



Non-Clogging Shower for White or Fresh Water

Lodding engineers, in search for a shower easy to clean when clogged, came up with a new design that is virtually non-clogging, now in successful operation.

Typical uses—foam-killing in head boxes, knock-off on fourdrinier wires, both inside and outside wire rolls, cylinder molds, screens, save-alls, felts.

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All of these 300 proven styles can be shown to you by a Hamilton Felt Service Salesman. If one of these "standard 300" won't solve your specific need, we will be happy to design a Hamilton Felt that will. Write us, without obligation — today.

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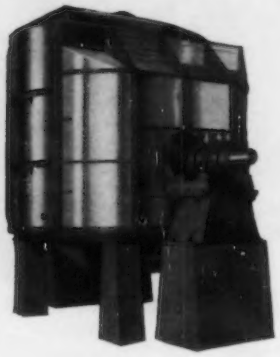
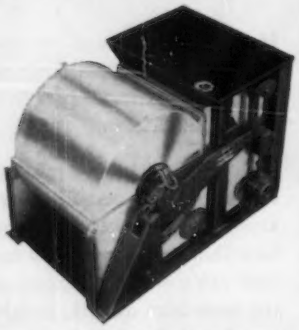


Jones **HI-LO PULPER** — Two separately powered rotors provide maximum pulping and complete defibering of even the toughest wet strength materials. Details in Bulletin EDJ-1063B.

Jones **BEATERS** — Complete "packaged" units of proven Jones-Bertrams design give better formation, more uniform treatment, substantial savings in time and operating cost. Bulletin EDJ-1079.



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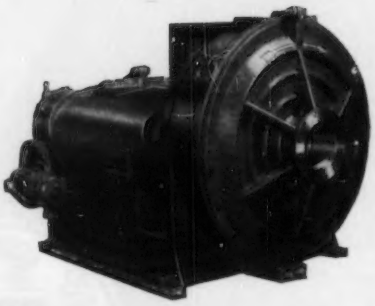

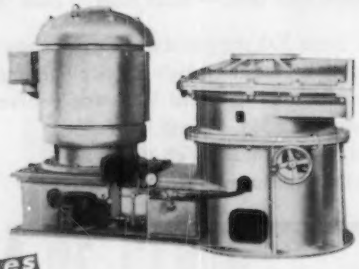

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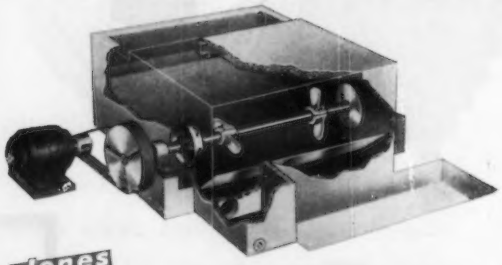

Jones **LIEBECK DISINTEGRATORS** — Low cost slushing for soft pulp, and broke not containing wet strength substances. Units and tanks custom-designed to fit your needs and space. Bulletin EDJ-1061.

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Paper Trade Journal | WEEK OF DECEMBER 29, 1958

World Newsprint Report

World newsprint demand in 1959 will exceed 14.2 million tons, a new annual record, it is estimated in Newsprint Data: 1958, the annual review of the world newsprint situation published by the Newsprint Association of Canada. The survey reviews trends in newsprint production and consumption in major markets and contains many tables and charts. A list of new capacity projects is also included. The data were drawn from reliable sources throughout the world. The review points out that world supply in 1958 decreased for the first time since the war. The decrease was less than 2.5 per cent and was due largely to a drop in demand by North American newspapers which use over half the world output.

Newsprint taken by North American publishers in 1958 was some six per cent less than in 1957 and about nine per cent less than in 1956. This decline followed a two year period in which North American supply jumped 16 per cent from its 1954 level.

Outlook For 1959

North American newsprint consumption in 1959 is estimated at 7.3 million tons, the same as in the previous peak year of 1956. Publishers' purchases may, however, be less than in 1956 by the 225,000 tons which they added to stocks during that year.

The trend in world supply, exclusive of North America and the Communist countries, was also interrupted in 1958. Estimated supply of all these countries is only one per cent greater than in 1957 in contrast to the average annual increase of nine per cent in the 1949-57 period. Estimated demand by these countries during 1959 is five per cent greater than 1958, a partial return to the normal rate. In contrast to the decrease in world shipments in 1958, newsprint capacity increased substantially. As a consequence, the free world nations have reserve capacity of about 2½ million tons.

After a decade in which capacity barely kept ahead of increasing demands, the North American newsprint manufacturers now have sufficient capacity to meet projected increases in demand. In addition, the industry is in a position to meet any sudden, large increase in demand such as that which occurred between late 1954 and early 1956. North American capacity in 1959 will be more than 500,000 tons greater than in 1958.

The survey sets Canadian shipments of newsprint in 1959 at 6,140,000 tons as compared with 6,000,000 tons in 1958. It cautions, however, that the 1959 estimate may be conservative if the current business expansion in the United States is sustained throughout 1959 and 1960.

World Pattern

The pattern of world trade in newsprint has changed during the last five years, the report indicates. One of the most significant developments is the creation of a large newsprint industry in the South. In 1959 total United States newsprint capacity will be about equally divided between the South and the older northern mills in Maine, New York, Oregon and Washington. Another significant development has been the advent of newsprint production in New Zealand and Chile.

Despite these developments, the free world depends heavily upon the large newsprint exporters, Canada and Scandinavia. In continental Europe, the increase in production since 1950 has met only 60 per cent of the increase in demand. Overseas countries taken together, excluding North America, Europe, and also Japan which is self-sufficient, have met less than half of their increased needs by increasing their own production.

South African Group Joins St. Regis

St. Regis Paper Co. announces that it is making its initial investment in the expanding economy of South Africa by the acquisition of a 50 per cent stock interest in a centrally-controlled group of container manufacturers in the Union.

The three companies, and their subsidiaries, which operate three plants—two in Johannesburg and one in Durban—are Transvaal Box Manufacturing (Pty.) Ltd.; National Containers (Pty.) Ltd., and Atlas Box Co. (Pty.) Ltd.

The associated organization, whose annual sales volume is currently in the neighborhood of $5 million manufactures and markets corrugated containers and a wide range of folding boxes and set-up boxes, for which it enjoys a steadily growing market.

Plans provide for the business of the South African group to be continued under the existing management which has built the business successfully during the past 23 years, with St. Regis to have equal representation on the various boards.

The South African container units will be supplied with the linerboard produced at the St. Regis new mill at Jacksonville, Fla. Furthermore, important technical aid will be provided by the St. Regis organization, which should considerably assist in plans for expansion in present and allied products by the South African group.

Rhinelander to Merge Into St. Regis

Rhinelander Paper Co. will be merged into St. Regis Paper Co. and will be established as a separate division of St. Regis effective January 1, 1959. The new division will be operated as before under the direction of all the former officers of the merged company. They are as follows: Folke Becker, chairman; Benton R. Cancell, president; W. R. Haselton, vice president operations (general manager); W. J. Davis, vice president sales; J. H. Fennema, vice president and treasurer; M. J. Kobernat, comptroller; Ruth Neumann, secretary.

Bowaters Southern Fourth Machine in Operation

The fourth newsprint machine at Bowaters Southern mill started production last week, operating at 2,000 feet per minute. This will increase annual capacity of the mill to 440,000 tons.

Concanco Georgia Mill Construction to Begin Soon

Continental Can Co. will begin construction early in 1959 of its 350-ton per day bleached kraft paperboard and paper mill on the Savannah River near Augusta, Ga. The mill is expected to be in operation in early 1961.

Continental will consume the bulk of the new mill's output in its own manufacture of folding cartons, plates, cups and other paper containers, and will offer the remainder for outside sale. Continental, which now operates three

Southern kraft mills and eight boxboard mills, does not currently produce its own bleached paperboard, although it converts bleached board purchased from outside sources.

The Augusta site has been selected with a view to future expansion.

The initial 350-ton per day capacity of the new mill will be provided by a Kamyr continuous digester and the sheet will be formed on a 216-inch trim fourdrinier paper machine on order from Beloit Iron Works. The plant is being designed to lend itself to step-by-step expansion. Engineering design and purchase of equipment is in progress at Continental's Greenville, S. C., engineering office of the Robert Gair Paper Products Group. J. E. Sirrine & Co., of Greenville is the engineering consultant.

Preliminary details on the mill were given in our Nov. 17 issue.

12th Bolton Award Subject Announced

"I Want to be Kept Informed" is the subject selected for the 12th Bolton Award according to an announcement made by the joint sponsors of this annual essay contest, and John W. Bolton & Sons Inc. and the APPMSA.

The contest period extends from January 1st to midnight March 31st. Entrants are asked to submit their papers typed, double spaced on plain sheets, 8½" x 11" and confined to approximately 1500 words. Cover sheets only are to include the author's name, name and address of the mill, home address and job title.

All papers are to be mailed to the secretary and treasurer, The American Pulp and Paper Mill Superintendents Association, 327 South LaSalle Street, Chicago 4, Illinois.

$3650 in cash prizes will be awarded to ten winners from the pulp and paper mill employees of North America. Top prize will be $1000, second, $750 and third $500. In addition there will be seven prizes of $200 each.

The ten Bolton Award winners will be announced at the Supts. Assn. Convention to be held in early June.

Wisconsin Group 25th Anniversary

Plans for the 25th anniversary annual meeting of members of the Wisconsin Paper Group to be held January 31st, have been announced. The quarter-century anniversary of the founding of the organization, which makes it possible for member companies to guarantee faster and more frequent deliveries of paper goods to their customers, will be suitably observed in a special program, following the annual luncheon meeting. The occasion will also mark the 25th consecutive year of service by Leo Schubart, Menasha, as treasurer of the Group.

Organized in 1934, with a membership of 19 Wisconsin paper manufacturers and converters, the Group now serves 35 Wisconsin firms which regularly take advantage of its car pooling and shipping service to carry the complete variety of Wisconsin-made papers to all markets of the United States.

Baltimore Co. Part of Bulkley Dunton

The Baltimore Paper Company, Inc., paper merchants, Baltimore, has become a part of the Bulkley Dunton Organization by joining the Carter Rice Storrs & Bement group, according to a joint announcement by J. O. Bulkley, president of Bulkley Dunton & Co., Inc., New York, and W. Edwin Snyder of the Baltimore firm.

Founded in 1913, the Baltimore Paper Co. is one of the older paper houses in that city. It is the second Baltimore paper distributor to come under the Carter Rice Storrs & Bement paper merchandising division of the Bulkley Dunton Organization. Earlier this year the O. F. H. Warner & Co. of Baltimore was acquired.

The Bulkley Dunton Organization, engaged in the merchandising, export and import of pulp, paper and paper products in 60 cities throughout the world, is observing its 125th anniversary this year, 1958.

Paper and Board Production

According to the American Paper and Pulp Assn., the ratio of the United States production to mill capacity for the week ending December 13, 1958, was 92.0 per cent compared with 92.7 per cent revised for the preceding week. The ratio was 91.3 per cent for the corresponding week a year ago.

The paperboard production ratio for the week ending December 13, 1958, was 94 per cent compared with 84 per cent for the preceding week and 92 per cent for the corresponding week last year.

(Detailed statistics on page 34.)

November, 1958 Newsprint Statistics

Production of newsprint in North America during November, 1958 amounted to 670,650 tons and was 3.9 per cent above the November, 1957 volume. Shipments totaled 678,271 tons in November, 1958 and were 2.2 per cent greater than shipments in the corresponding month of 1957. According to the Newsprint Service Bureau, output in the United States was 152,550 tons and shipments were 150,583 tons, and respective increases from November, 1957 amounted to 8.7 per cent and 5.2 per cent. Canadian production amounted to 518,100 tons and shipments totaled 527,688 tons, which represents an increase of 2.6 per cent in output over the November, 1957 volume which had been reduced by a strike in the British Columbia mills, while shipments recorded a gain of 1.4 per cent.

Production of newsprint paper in North America through the end of November, 1958 amounted to 7,232,403 tons, which was 416,042 tons or 5.4 per cent below the historical high attained in the same period of 1957. United States mills produced 1,613,082 tons or 74,131 tons and 4.4 per cent less than in the first eleven months of 1957. Output in Canada amounted to 5,619,321 tons and was 341,911 tons or 5.7 per cent under the volume produced in the first eleven months of 1957.

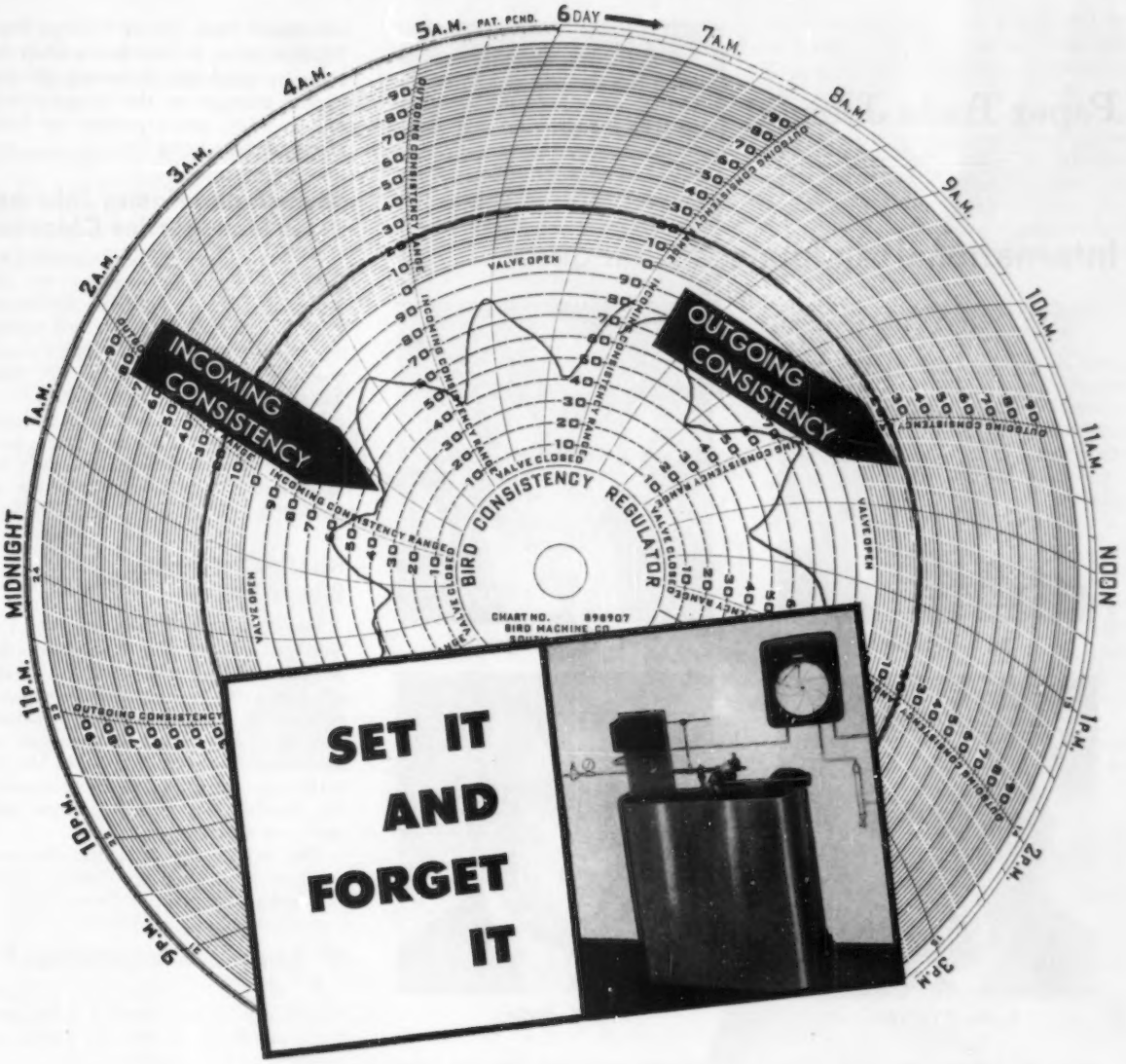
North American manufacturers' stocks on November 30, 1958 aggregated 223,312 tons compared with 230,933 tons on the last day of the preceding month and 184,262 tons at the end of November, 1957. The continental total was composed of 20,601 tons and 202,711 tons held by United States and Canadian mills repectively, and inventories were higher than a year ago by 4,896 tons in the former instance and by 34,154 tons in the latter.

S. Africa to Make Newsprint in 1961

Newsprint production in South Africa will begin early in 1961, it was announced by South African Pulp & Paper Industries, Ltd.

The plant will be at Springs, and will be the first in the country. Capital cost of the venture is about £2.7 million, and it is expected to save the country more than £ million annually in foreign exchange.

Initial capacity will be about 30,000 tons annually. Experiments have shown that newsprint can be made from the fastgrowing South African pine.



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Canadian Manufacturers of Bird Machinery
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International Announces Changes

A. B. Copping

T. G. Mangan

L. G. Thurston

H. P. Bailey

Allan B. Copping has been named Manager of International Paper Co.'s Otis Mill in Chisholm, Maine, effective January 1, 1959, it was announced by S. E. Kay, vice president.

Mr. Copping replaces Thomas G. Mangan, who is retiring on December 31, 1958, after forty-two years of service with the company.

Mr. Copping, assistant manager at the mill until his present appointment, is a graduate of McGill University in Montreal, Canada. He joined International Paper Co. in 1925 when that company purchased the DeGrasse Paper Co. In subsequent years, Mr. Copping worked at the Corner Brook, Newfoundland, Mill; in Glens Falls, N. Y., and at the Otis, Maine, Mill, as a technical superintendent. In 1939, he was transferred to the Hudson River Mill on special assignment and in 1946, he was appointed assistant manager. In September, 1958, he was named assistant manager at the Otis Mill.

—Mr. Mangan was born in Pittsfield, Mass., and graduated from the University of Maine. He joined International Paper Co. as a draftsman in the company's New York Office in 1916. In 1927, Mr. Mangan was appointed manager of the Berlin, New Hampshire, Mill, and two years later moved to Chisholm as manager of the company's Otis Mill, which position he is holding at the present time. Laurence G. Thurston has been named Manager of the Niagara Falls Mill of International Paper Co., effective January 1, 1959.

Mr. Thurston replaces H. Perry Bailey, who is retiring, December 31, 1958, after thirty-eight years of company service.

Mr. Thurston, assistant manager at the mill until his present appointment, is a graduate of the University of Maine. He joined International Paper in 1926 at its Piercefield, N. Y., Mill. He moved to the Niagara Falls Mill in August, 1958.

Mr. Bailey is also a graduate of the University of Maine. He came with International Paper Co. in 1920 as Plant Superintendent in Van Buren when the company purchased Aroostook. He was named manager of the Niagara Falls mill in 1929, which position he holds at the present time.

Wyomissing Names Johnson Sales Manager for Chicago

E. F. Johnson has been named Chicago regional sales manager for the Wyomissing Paper Products division of The Narrow Fabric Co. He will handle the sale of all of Wyomissing's paper products with headquarters at 222 West Adams Street, Chicago 6, Illinois.

Mr. Johnson has had wide experience in the paper and laminating fields, having previously been associated with the Marvellum Co. and more recently as sales manager of Nylco Products Inc.

Northwest Paper Elects VP

The Board of Directors of The Northwest Paper Co. announces the election of Clarence P. Sheldon to the office of vice-president of the company. Bernard W. McEachern, vice-president, has been appointed to manager of marketing, with responsibility for all marketing activities of the company. Mr. Sheldon has been appointed general sales manager.

The Board of Directors also announces the election of Glenn J. Ayres as assistant secretary.

St. Lawrence Appointment

P. M. Fox, president of St. Lawrence Corp. Ltd., Montreal, announces the appointment of Wm. G. James, as assistant to the president.

Formerly managing editor of The Canadian Statesman, Bowmanville, Ont., Mr. James has been directing the Public Relations and Promotion program of the Canadian Weekly Newspapers Assn.

Mr. James will be responsible in assisting with the formulating and direction of the corporation's public relations and advertising policy.

Riegel Names Strauss Purchasing Director

Riegel Paper Corp. has announced the appointment of A. J. Strauss to the newly created position of director of purchases. He will report to R. L. Kerridge, vice president, and administer policy on purchasing and its effect on inventory control, and trade relations for all divisions of the corporation. His office will continue to be located at the Milford (N.J.) mill.

Harry L. Singley, assistant purchasing

agent, will assume responsibility for over-all administration of the purchasing department for the New Jersey division.

Hammermill Appointments

Election of Fred E. Bahrenburg as vice president and his appointment to the newly-created position of manager of mills and the promotion of Robert S. Young to the newly-created position of manager of mill operations, Erie division, have been announced by Donald S. Leslie, president of Hammermill Paper Co., Erie, Pa.

Mr. Bahrenburg, who is a Hammermill director, was formerly plant manager of the Erie division and has been and will continue as general manager of the Watervliet Paper Co., a Hammermill division located at Watervliet, Mich. Mr. Young was formerly general superintendent of the Erie mill.

F. E. Bahrenburg

R. S. Young

A 1930 pulp and paper graduate of the New York State College of Forestry at Syracuse University, Mr. Bahrenburg came to Hammermill in 1948 from the Strathmore Paper Co. where he was assistant to the president.

Robert S. Young started his mill career as a helper on the rewinders in the finishing room. In 1918 he transferred to the paper mill and moved up to beater room foreman in 1930 and to assistant paper mill superintendent in 1945.

In 1947 he returned to the finishing division as superintendent where he remained until 1953 when he was appointed assistant superintendent of manufacturing. In 1955 he was promoted to manufacturing superintendent and two years later became general superintendent.

Sales Rep for Brown

Theodore M. Marshall, Jr., of Bend, Ore., has been named Pacific Northwest sales representative for Brown Co., manufacturers of pulp, paper, and other forest products, with plants in Oregon and Northern New England, it was announced from Brown's West Coast sales offices in San Francisco.

Clarke Elected VP

E. Way Clarke, who has been associated with Knowlton Bros., specialty paper making firm, for nearly 45 years, was elected a vice president of the firm at the quarterly meeting of the board of directors.

Mr. Clarke has been production manager and purchasing agent with the company since 1941.

If it takes 7.05 milligrams of Bond Blue B to match a blue on laboratory sheets weighing 3 grams, how many pounds of dye per ton would you call for, to produce the same shade in the mill?

Warning: A simple transposal to equivalent pounds of dyestuff per ton of stock will give the wrong answer.

For a technical article discussing the problem of adjusting a laboratory dye formula to meet requirements of the individual mill, drop us a line. It is the latest Sandoz publication, designed to increase the industry's understanding of color and its application to pulp and paper.

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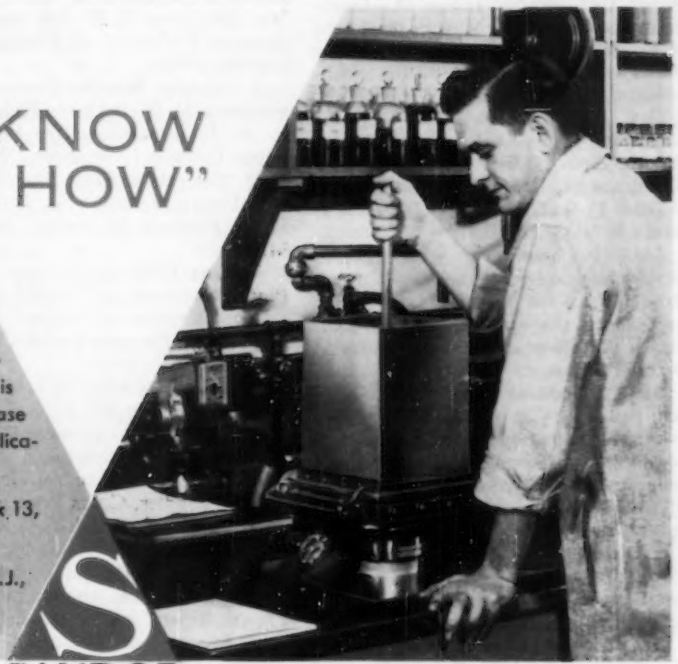


SANDOZ

Sandoz

THINKS AHEAD WITH PAPER

SANDOZ

J. A. Chadbourne

F. E. May

Strathmore Elects Two New Directors

The stockholders of Strathmore Paper Co., elected Joseph A. Chadbourne and Fred E. May to the board of directors. In addition, the following directors were re-elected by the stockholders: Roy F. Arnold, Harold A. Bolles, F. Nelson Bridgham, Cassius M. Bryan, Henry D. Johnston, William A. McGilpin, Harry E. Riggs, Willis H. Sanburn, Laurence W. Shattuck, Bradley E. Stafford, Paul A. Wilks and Bemis P. Wood.

Mr. Chadbourne is president and general manager of the Old Colony Envelope Co. of Westfield. He is also president of the Westfield Savings Bank and is a director of the First National Bank of Westfield.

Mr. Chadbourne joined the Old Colony Envelope Co., in 1930 as assistant treasurer and has been successively treasurer, vice president, and general manager, before becoming president in 1946. Mr. May is president and general manager of the Rising Paper Co., of Housatonic. He joined the Strathmore Paper Co., in 1907 and held various positions in the manufacturing, order, sales promotion and sales departments. During his service in the manufacturing department, he held the position of superintendent of the company's Woronoco No. 2 Mill. He was also elected vice president in charge of sales and a director of the Rising Paper Co., in 1933 and became president of the company in 1947.

44th TAPPI Annual Meeting

The 44th Annual TAPPI Meeting will be held at the Commodore Hotel, New York, N. Y., on Feb. 23-26, 1959.

The following is the tentative technical program.

Monday

9:00 a.m. FOREST BIOLOGY SESSION I

9:30 a.m. ANNUAL MEETING

2:00 p.m. FOREST BIOLOGY SESSION II

Tuesday

9:00 a.m. GENERAL SESSION I

1. "Phenol for Use in Molded Pulp Products," by Fred Horowitz and Bayard Carlson, Booty Resineers Div., American-Marietta Co., Newark, Ohio.

2. "Adopting the Orphan of the Paper Industry," by C. R. Stevens, Charles R. Stevens, Inc., Maumee, Ohio.

9:00 a.m. ALKALINE PULPING SESSION

9:00 a.m. CYLINDER BOARD SESSION I

9:00 a.m. FLUID MECHANICS SESSION.

1. "Secondary Motions in Flow Between Concentric Rotating Cylinders," by David W. Appel, University of Kansas, Lawrence, Kan.

2. "Instability of Flow on the Fourdrinier Wire-Report of TAPPI Project No. 140," by C. S. Yih and A. C. Spengos, University of Michigan, East Lansing, Mich.

3. "Internal Pressure Distributions in Compressible Mats Under Fluid Stress," by W. L. Ingmanson, The Institute of Paper Chemistry, Appleton, Wis.

4. "Secondary Flow Phenomena in Non-Linear Fluids," by J. L. Ericksen, Johns Hopkins University, Baltimore, Md.

5. "The Friction of Paper Stock in Pipes—Summary of TAPPI Research at the University of Maine," by K. J. MacKenzie, Eastman Kodak Co., Rochester, N. Y.

9:00 a.m. STATISTICS SESSION I

M. S. Renner, W. R. Grace & Co., Dewey and Almy Chemical Div., Cambridge, Mass. *Chairman*

1. "Acceptance Control Charts," by C. H. Chandler, Color Print and Processing, Eastman Kodak Co., Rochester, N. Y.

2. "A General Model for Interlaboratory Evaluation as Applied to the Testing of Paper," by J. Mandel, Testing and Specifications Section, National Bureau of Standards, Washington, D. C.

2:00 p.m. CORRUGATED CONTAINERS SESSION I

C. J. Zusi, New England Village, Evanston, Ill. *Chairman*

1. "Quality Control in the Box Shop." by B. Mendlin, Cornell Paperboard Products, Milwaukee, Wis.

2. "Quality Control Inspection from Customer's Viewpoint," by R. T. Holt, Scott Paper Co., Chester, Pa.

3. "Testing Machines Available for Quality Control," by W. F. Bachelder, Testing Machines, Inc., Mineola, L. I., N. Y.

4. "Statistics for Corrugated Quality Control," by G. G. Maltenfort, Container Corp. of America, Chicago, Ill.

5. "Box Shop Management's Viewpoint on Quality Control."

2:00 p.m. FOURDRINIER SESSION

1. "Experiences in the Use of All-Synthetic Drier Felts," by E. Race, Scapa Dryers Ltd., Blackburn, England.

2:00 p.m. CYLINDER BOARD II

2:00 p.m. ACID PULPING SESSION

1. "Pressurized High Consistency Screening in the Pulp Mill," by R. Cross, Black-Clawson Co., Hamilton, Ohio.

2. "Developments in Swedish Sulphite Pulping," by L. Stockman, Swedish Central Research Laboratory, Stockholm, Sweden.

3. "Stainless Steel Linings," by Vulcan Copper & Supply Co., Cincinnati, Ohio.

2:00 p.m. STATISTICS SESSION II

J. G. Strieby, Kimberly-Clark Corp., Neenah, Wis. *Chairman*

1. "Evolutionary Operation in Chemical Processes," by J. C. Whitevell, Professor of Chemical Engineering, Chemical Engineering Laboratory, Princeton, N. J.

2. "Example: An Application of Fractional Factorial Designs to a Study of Paper Making Variables," by R. W. Roberts, Marathon Corp., Menasha, Wis.

Wednesday

9:00 a.m. CORRUGATED CONTAINERS SESSION II

H. E. Dunholter, Eastern Box Co., Baltimore, Md. *Chairman*

1. "Operating Experiences on the S & S Die Cut Press," by D. Davis, The Hercules Box Co., Columbus, Ohio.

2. "Operating Experiences on the International Glue Machine," by D. C. Dowd, Charles Dowd Box Co., Inc., Worcester, Mass.

3. "A New Design Printer-Slotter."

4. "A Revolutionary Concept in the Art of Corrugating Paperboard—The New and the Old Compared," by H. W. Wilson, Royal Container Co., San Francisco, Calif.

9:00 a.m. GRAPHIC ARTS SESSION I

J. M. Fetsko, Lehigh University, Bethlehem, Pa. *Chairman*

1. "Round Robin Pick Measurements on Offset Machine Coated Paper"

(Progress Report from TAPPI Research Project No. 130), by W. D. Schaeffer, Lehigh University, Bethlehem, Pa.

2. "Investigation of Smoothness and Compressibility of Paper and Paperboard as Related to Printability" (Progress Report from TAPPI Research Project No. 139), by G. R. Sears, The Institute of Paper Chemistry, Appleton, Wis.

3. "Printability of Newsprint," by R. Prince and A. S. Taylor, A.N.P.A. Research Laboratories, Easton, Pa.

4. "Photographic Examination of Paper and Paperboard Surfaces to Predict Halftone Printing Quality," by R. O. Ragan, Chicago Carton Co., Chicago, Ill.

5. "Proof Press Technique for Evaluating Ink Receptivity," by K. L. Strachen, R. R. Donnelly & Sons Co., Chicago, Ill.

9:00 a.m. DISSOLVING PULPS SESSION I

Joint TAPPI-ASTM-AGS Symposium on Chemical Methods for Testing Cellulose

1. "New Approaches to Analysis and Testing of Pulp and Paper Through Instrumental Techniques," by S. Z. Lewin, New York University, New York, N. Y.

2. "Dry Ashing of Pulp and the Factors Which Influence It," by L. H. Phifer and J. B. Maginnis, American Viscose Corp., Marcus Hook, Pa.

3. "Determination of Starch in Paper," by J. L. Harvey, B. W. Forshee, and D. Fletcher, National Bureau of Standards, Washington, D. C.

4. "Direct Colorimetric Estimation of Xylose in Wood Pulp," by K. A. Kuiken and A. F. Johnson, The Buckeye Cellulose Corp., Memphis, Tenn.

5. "Progress Report on the Interlaboratory Testing of Pentosan and Carboxyl Methods," by W. K. Wilson, National Bureau of Standards, Washington, D. C.

9:00 a.m. CHEMICAL ENGINEERING SESSION

1. "Systems Engineering and Operations Research in the Pulp and Paper Industry," by E. F. Thode, The Institute of Paper Chemistry, Appleton, Wis.

2. "The Application of an Analog Computer to a Paper Manufacturing Problem," by L. W. Zabel, Kimberly-Clark Corp., Neenah, Wis.

3. "An Operations Research Approach to the Economic Balance in a Kraft Pulping Process," by C. W. Carroll, The Institute of Paper Chemistry, Appleton, Wis.

9:00 a.m. WATER SESSION I

J. Patrick, West Virginia Pulp and Paper Co., Luke, Md. *Chairman*

1. "Water Conditioning Trends in the Paper Industry," by S. B. Applebaum, Cochrane Corp., Philadelphia, Pa.

2:00 p.m. CORRUGATED CONTAINERS SESSION III

E. J. Kiddie, Owens-Illinois Products Div. Jacksonville, Fla. *Chairman*

Question-and-Answer Session

2:00 p.m. GRAPHIC ARTS SESSION II

J. H. Wing, Gair Paper Products Group, Continental Can Co., Uncasville, Conn. *Chairman*

Panel: "Paper From the Printer's Viewpoint."

2:00 p.m. DISSOLVING PULPS SESSION II

Joint TAPPI-ASTM-ACS Symposium on Chemical Methods for Testing Cellulose

W. M. Baldwin, Jr., Tennessee Eastman Corp., Kingsport, Tenn. *Chairman*

Panel Discussion: "Color of Cellulose."

2:00 p.m. CHEMICAL PRODUCTS SESSION

P. B. Borlew, Celulosa de Chihuahua, Colonia Anahuac, Chihuahua, Mexico. *Chairman*

1. "Oxidation of Resin Acids," by R. V. Lawrence, Naval Shores Research Station, U. S. Dept. of Agriculture, Olustee, Florida.

2. "Estimation of Tall Oil in Sulphate Black Liquor," by W. Saltsman and K. A. Kuiken, Buckeye Cellulose Corp., Memphis, Tenn.

3. "Determination of Rosen Acids in Tall Oil," by E. H. Sheers and L. S. Stevenson, American Cyanamid Co., Stamford, Conn.

4. "Acetic & Formic Acid from Neutral Sulphite Semi-chemical Black Liquor," by A. Biggs, Sonoco Products Co., Hartsville, S. C.

2:00 p.m. WATER SESSION II

E. N. Poor, Hudson Pulp & Paper Corp., Augusta, Me. *Chairman*

1. "Reversible Diatomite Filtration for Paper Mill Water," by J. G. Brown, Reversible Filtration and Granger Filters, Wakefield, Mass.

Thursday

9:00 a.m. GENERAL SESSION II

1. "The Distribution of the Constituents Across the Wall of Unbleached Spruce Sulphite Fibers," by O. Kallmes.

2. "Evaluation of Brightness Changes in High Yield Pulps Treated with Sodium Borohydride," by P. Luner, College of Forestry, State University of N. Y., Syracuse, N. Y.

3. "The Mechanism of the Acidic Chlorination of Lignin," by C. Dence, College of Forestry, State University of N. Y., Syracuse, N. Y.

4. "Sorption Studies of a Modified Locust Beam Gum on a Bleached Sulphite Pulp," by E. F. Thode, The Institute of Paper Chemistry, Appleton, Wis.

9:00 a.m. MECHANICAL PULPING Session

9:00 a.m. PULP PURIFICATION SESSION

1. "Peroxide Chemistry as Related to Pulp Bleaching," by A. F. Chadwick, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2. "Physical Properties of Bleached High Yield Pulp," by N. N. Coe and H. L. Crosby, Dorr-Oliver, Inc., Stamford, Conn.

3. "The Effect of Pulp History on Pulp Response During Hypochlorite Bleaching," by J. C. Paulson, Buckeye Cellulose Corp., Memphis, Tenn.

4. "Oxidation of Some Simple Organic Compounds with Aqueous Chlorine Dioxide Solutions," by R. A. Somsen, Olin Mathieson Chemical Corp, W. Monroe, La.

5. "Pulp Bleaching with Sodium Chlorate," by W. H. Rapson, C. B. Anderson and R. W. Millen, University of Toronto, Toronto, Canada.

9:00 a.m. STRUCTURAL FIBERS MATERIALS SESSION

1. "Determining the Insulation Board Forming Characteristics of Experimental Stock Finishes," by E. J. Reichman, Simpson Timber Co., Seattle, Wash.

9:00 a.m. DISSOLVING PULPS SESSION III

Dissolving Pulps and End Products F. A. Simmonds, U. S. Forest Products Laboratory, Madison, Wis. *Chairman*

1. "The Spinning of Viscose Tire Yarn as Related to Its Structure and Properties," by W. A. Sisson, American Viscose Corp., Marcus Hook, Pa.

2. "Characteristics and Performance of Rayon Tire Cords," by M. W. Wilson, The B. F. Goodrich Co., Akron, Ohio.

3. "Degradation of Cellulose by Ultraviolet Light," by J. H. Flynn, National Bureau of Standards, Washington, D. C.

4. "Outline for a Basic Study of the Differences Between Cotton Linter and Wood Pulps," by H. Kraessig and E. J. Howard, Industrial Cellulose Research Ltd., Hawkesbury, Ont., Canada.

9:00 a.m. MICROBIOLOGY SESSION

G. R. Hunt, National Aluminate Corp., Chicago, Ill. *Chairman*

1. "Microbiology of the Purification of Polluted Waters," by H. Henkelekian, Dept, of Sanitation, Rutgers, The State University, New Brunswick, N. J.

2. "New Technique for Biocide Evaluation," by A. Stern, West Virginia Pulp and Paper Co., Covington, Va.

3. "Paper Manufacture Under Sterile Conditions," by N. Alper, Chemical Research Laboratories of America, Inc., Lafayette, R. I.

4. "The Cost Efficiency Approach to Slime Control," by S. J. Lederer, Metalsalts Corp., Hawthorne, N. J.

Recent Developments in the Manufacture of Chlorine Dioxide

Progress in understanding reactions by which chlorine dioxide is formed, has led to improved operation and a new process.

W. Howard Rapson

Professor of Chemical Engineering
University of Toronto

Fundamental studies on the kinetics of formation of chlorine dioxide have led to an hypothesis concerning the mechanism of the reactions involved. This has lead to improvements in the manufacture of this important bleaching and oxidizing agent. Older processes have been made more efficient and some new ones have been developed.

A new process, patented by the author and assigned to Electric Reduction Co. of Canada Ltd. in Canada, and Hooker Chemical Corp. in the United States, employing sodium chlorate, sodium chloride and sulphuric acid as raw materials, is outlined. Recent improvements in the Mathieson, Solvay and Day-Kesting processes are reviewed, as well as the new Columbia-Southern modifications of the Persson process.

Trends in absorption tower design, in materials of construction and in bleaching with chlorine dioxide are briefly indicated.

Chlorine dioxide has come into widespread use as a bleaching agent in the pulp and paper industry in the last five years. It is explosive spontaneously at high partial pressures and readily at relatively low partial pressures by an electric spark, or any other means of producing a high temperature locally. Therefore chlorine dioxide cannot be manufactured at a central location and shipped to the consumer economically. For small uses such as flour bleaching where a high cost can be tolerated, chlorine dioxide is being frozen as a hydrate at 16 per cent concentration and shipped and stored under refrigeration.[1] For use as an antiseptic, chlorine dioxide is being dissolved in a solution of sodium perborate, with which it forms a stable complex[2]. A four per cent solution can be safely shipped, from which the chlorine dioxide is released by acidification at the point of use.

For large scale use chlorine dioxide is manufactured in consumer's plant from sodium chlorate, sulphuric acid and a reducing agent, which is usually either sulphur dioxide or methanol. There are now 50 chlorine dioxide plants in pulp mills on this continent, 32 using sulphur dioxide, 17 methanol and one hydrochloric acid as the reducing agent.

W. H. Rapson

Dr. Rapson is undoubtedly the foremost authority in North America on the subject of chlorine dioxide bleaching.

The six different processes now in use for generating chlorine dioxide in pulp mills were compared by the author in 1954[3]. Three of these use sulphur dioxide directly as the reducing agent. In the Rapson-Wayman process[4] concentrated sodium chlorate solution is continuously passed down a packed tower counter-current to a stream of dilute sulphur dioxide in air or other inert gas, no sulphuric acid being required. The Holst process[5], widely used in Sweden, involves treating a sulphuric acid solution of sodium chlorate with dilute sulphur dioxide gas batchwise in a tank. The Mathieson process[6] continuously generates chlorine dioxide from a sulphuric acid solution of sodium chlorate with sulphur dioxide in a vigorously agitated tank. In the Persson process[7] the reducing agent is chromic sulphate, which is continuously oxidized by the acidified chlorate to chromic acid, which is reduced to chromic sulphate by sulphur dioxide in a separate cycle. The Solvay process[8] involves continuously reducing sodium chlorate with methanol in sulphuric acid solution. The Day-

Based on a paper presented at the Joint A.I.Ch.E.-C.I.C. Chemical Engineering Conference, Montreal, Que., April 20-23, 1958. Reprinted from The Canadian Journal of Chemical Engineering, Volume 36, December, 1958.

Kesting process[9] involves oxidizing sodium chloride to chlorate in electrolytic cells, and reducing the chlorate to chlorine electrolytic cells, and reducing the chlorate to chlorine dioxide with hydrochloric acid in two interlocking continuous cycles.

Since 1954 several of these processes have been improved in important respects. Considerable progress has been made in understanding the mechanism of the reactions by which chlorine dioxide is formed in these processes, and this has led to improved operation of the existing plants and the development of a new process.

Mechanism of Formation from Chlorates

The author has previously suggested that chlorine dioxide is formed from chlorates by the same basic mechanism in all processes[10]. This concept is supported by certain facts. First, in all processes the chlorine dioxide is formed from chlorates only in strong acid solutions. It is very significant that the Holst, Rapson-Wayman, Solvay, Mathieson and Persson processes all operate in a solution which is between 8 and 10 normal in sulphuric acid. In the case of the Rapson-Wayman process, the solution ends up about 9 normal in sulphuric acid, even though no sulphuric acid is added in the process, and no attempt is made to control the acidity.

The second significant fact is that chlorides are found in the generator solution in all processes, usually in a concentration between 0.02 and 0.08 molar. In the Holst process which is operated batchwise, the chloride concentration is almost vanishingly low at the beginning when the chlorate concentration is high, but it increases gradually as the chlorate concentration drops, until it is relatively high when the chlorate is exhausted.

Therefore it is postulated that the primary reaction in all chlorine dioxide manufacture from chlorates is the reaction between chloric acid and hydrochloric acid to form chlorine dioxide and chlorine. The following reaction mechanism would account for this satisfactorily by a series of bimolecular reactions;

$$HClO_3 + HCl \rightarrow HClO_2 + HClO \quad (1)$$

$$HClO_3 + HClO_2 \rightarrow 2ClO_2 + H_2O \quad (2)$$

$$HClO + HCl \rightarrow ClO_2 + H_2O \quad (3)$$

Summary reaction $2HClO_3 + 2HCl \rightarrow 2ClO_2 + Cl_2 + 2H_2O$ (4)

This mechanism accounts for the stoichiometry of reaction **(4)** very well. Reaction **(3)** is well known. The hypothesis receives additional support from the fact that in our laboratory, conditions have been found for converting one mole of sodium chlorate into two moles of chlorine dioxide by reaction with an excess of sodium chlorate in sulphuric acid solution as in reaction **(2)**. However, this mechanism cannot be said to have been proven. An intensive investigation is under way attempting to elucidate the mechanism, but the over-all reaction **(4)** has been clearly demonstrated to occur.

The R2 Process

Arising out of this hypothetical reaction mechanism, a new process for making chlorine dioxide has been developed[11], tested in pilot plants, and patented[12], in which sodium chlorate and sodium chloride in sulphuric acid are very nearly quantitatively converted into chlorine dioxide and chlorine according to reaction **(4)**. In this continuous process, for convenience called the R2 process, streams of concentrated sodium chloride solution, concentrated sodium chlorate solution and concentrated sulphuric acid are metered into a vigorously agitated reaction vessel (Figure 1). Air is blown into the reactor through porous plates over which draught tubes are placed to promote circulation of the liquid. Due to the vigorous turbulence, the concentrated solutions are immediately diluted by the generator solution, which continuously overflows from the vessel. The air continuously removes the chlorine dioxide and chlorine formed in the solution by reaction **(4)**. A steady state is reached in which the composition of the generating solution remains constant.

The optimum conditions within the reactor are 0.1-0.2 molar sodium chlorate, 9-10 normal sulphuric acid, and a low chloride concentration. The latter seeks its own level, depending on the acidity, the concentration of the chlorate, and the temperature. Usually the chloride concentration falls within the range 0.02 to 0.08 molar. The solution is very nearly saturated with respect to sodium acid sulphate.

In the R2 process the chlorate which is decomposed is converted into about 99 per cent of the theoretical chlorine dioxide. The ratio of chlorine dioxide to chlorine formed is very close to 2 moles to 1, indicating that the reaction proceeds nearly theoretically according to reaction **(4)**.

The chlorine dioxide is absorbed in water in a packed tower preferentially to chlorine due to tenfold greater solubility. Although about 10% chlorine remains in the chlorine dioxide, very little chlorine dioxide leaves the tower with the chlorine, which may be dissolved in sodium hydroxide solution to form sodium hypochlorite, or used in some other way.

Very little heat is produced in the R2 generator, other than that evolved by dilution of the concentrated sulphuric acid. Therefore the generator can be of very simple design, since no heat exchange is required.

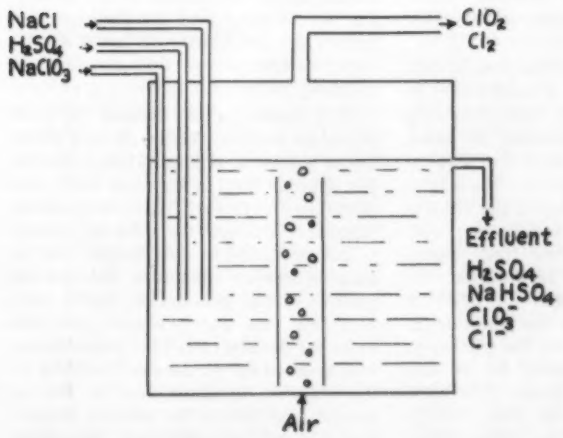


Figure 1—The R2 chlorine dioxide generator.

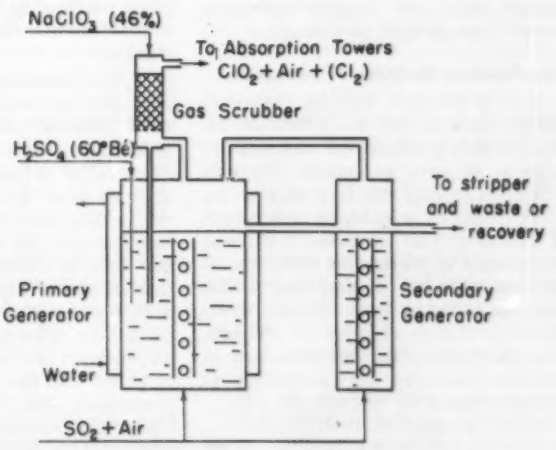


Figure 2—Mathieson ClO_2 generator, as modified by Electric Reduction Co. of Canada Limited.

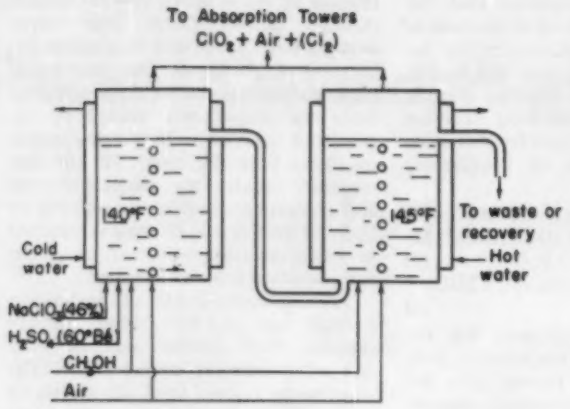


Figure 3—New Solvay ClO_2 generator.

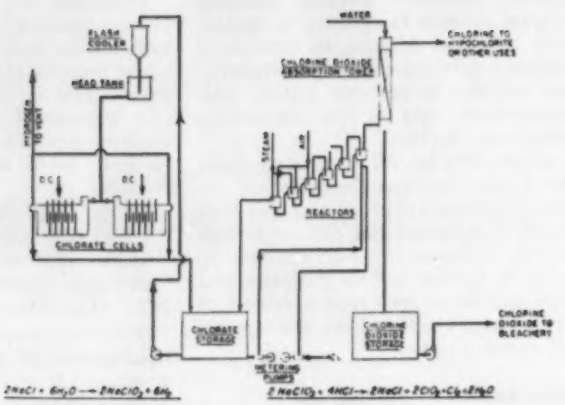


Figure 4—Day-Kesting ClO_2 process.

Unfortunately when sodium chloride is used along with sodium chlorate, twice as much sulphuric acid is required per unit weight of chlorine dioxide to purge the extra sodium ion from the system while maintaining the required acidity. Therefore if the sulphuric acid and the sodium sulphate in the liquid effluent from the reactor are thrown away, the R2 process does not make chlorine dioxide as cheaply as other processes. If the effluent is used to provide sodium sulphate make-up for the kraft pulping process, it is cheaper than other processes in locations where sodium sulphate is expensive and sulphuric acid is cheap, such as in southern United States. However, if sodium acid sulphate is crystallized out of the effluent and used for kraft make-up, the excess sulphuric acid is recovered for re-use. The R2 process then makes chlorine dioxide cheaper than any previous process from sodium chlorate.

The R2 process has been assigned to Hooker Electro-chemical Co. in the United States and Electric Reduction Co. of Canada Ltd. in Canada.

Application to Other Processes

It is postulated that the reactions taking place in the R2 generator are those which produce the chlorine dioxide in all other generators. The only difference lies in the fact that in the other processes a reducing agent such as sulphur dioxide, methanol or chromic acid is used to prevent the formation of chlorine, or at least to minimize it. This is accomplished by reducing either hypochlorous acid or chlorine to chloride, thus maintaining the concentration of chloride necessary for formation of chlorine dioxide by reaction **(4)**

$$HClO + H_2SO_3 = HCl + H_2SO_4 \quad \text{.....(5)}$$

$$HClO + CH_3OH = HCl + HCHO + H_2O \quad \text{.....(6)}$$

$$HClO + HCHO = HCl + HCOOH \quad \textbf{(7)}$$

If, due to the escape of some chlorine or chloride from the generator, the chloride concentration tends to drop below that required for maintaining the desired chlorine dioxide production rate, or if excess reducing agent is fed into the generator, some chlorate will be reduced to chloride providing the necessary reactant.

$$HClO_3 + H_2SO_3 = HClO_2 + H_2SO_4 \quad \text{.....(8)}$$

$$HClO_2 + H_2SO_3 = HCl + H_2SO_4 \quad \textbf{(9)}$$

$$HClO + H_2SO_3 = HCl + H_2SO_4 \quad \textbf{(10)}$$

The importance of chloride in all chlorine dioxide manufacturing processes has been clearly demonstrated by adding silver sulphate to precipitate chlorides in laboratory experiments with acidified chlorate and various reducing agents. In no case was any significant amount of chlorine dioxide formed. Even with sodium chlorate in acid solution no chlorine dioxide was formed in the presence of silver sulphate, indicating that chloride is essential for the formation of chlorine dioxide.

If the postulated mechanism is correct, then two sources of inefficiency in most chlorine dioxide manufacturing processes are the reduction of some chlorate to chloride, and the loss of chlorine from the generator. Since both the chloride over-flowing in the effluent solution and the chlorine leaving with the chlorine dioxide arise from reduction of some chlorate to chloride, the author has suggested that the addition of sodium chloride to the chlorate in all processes may improve the efficiency. A patent has been applied for on this procedure. Olin Mathieson Chemical Corp. has recommended that 5-10% sodium chloride be added to the chlorate solution fed into the Mathieson generator.[13]

This concept of the mechanism of the reactions producing chlorine dioxide has helped greatly in understanding the operation of chlorine dioxide generators. For example in the Mathieson generator it is often found that the rate of chlorine dioxide production is not immediately increased on increasing the rate of flow of sulphur dioxide into the generator. This is now readily understood, since the rate of chlorine dioxide production cannot be increased except by increasing the chloride concentration, when the temperature, acidity and chlorate concentration are maintained constant. Therefore the increased rate of production of chlorine dioxide desired cannot be accomplished until sufficient chloride has been formed by reduction of chlorate with SO_2 to provide the necessary chloride concentration for the new level of production rate.

If the SO_2 flow is stopped without decreasing the rate of air flow, chlorine dioxide continues to be produced at a slowly diminishing rate as the chloride concentration diminishes in the generator. At the same time the chlorine content of the gas leaving the generator increases. This shows that reaction **(4)** is taking place.

If a generator is allowed to stand overnight without feeding in any chlorate or sulphuric acid or sulphur dioxide, the chloride level is very low when production of chlorine dioxide is resumed. Therefore on start-up chlorine dioxide is not produced at the desired rate as soon as sulphur dioxide is fed into the generator, but production begins at a very low rate and gradually increases up to the desired rate. This phenomenon is accounted for by the need to build up the chloride concentration to the required level before the desired production rate can be established. This start-up period can be eliminated by adding to the generator sodium chloride in

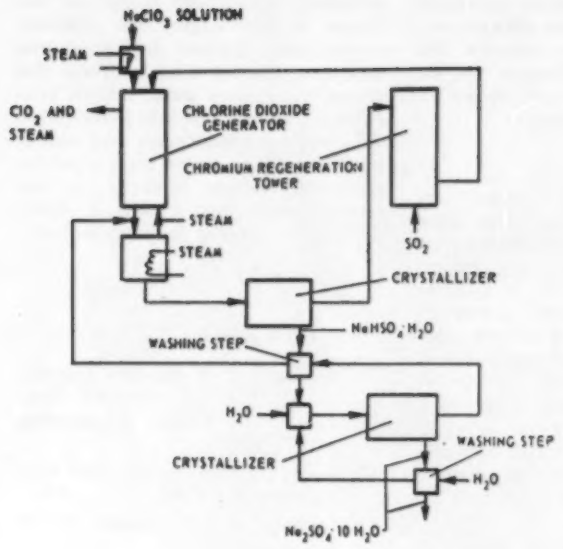


Figure 5—Columbia-Southern ClO_2 process.

sufficient amount to immediately establish the chloride concentration at the required level.

Improvements in Mathieson Process

A study of the Mathieson process in a pilot plant in our laboratory showed that under certain conditions some sulphur dioxide gets through the generator solution unreacted. On reaching the gas phase above the generator this sulphur dioxide first reacts with the chlorine present in the gas producing sulphuric acid and hydrochloric acid.[14] If the amount of SO_2 escaping is more than enough to reduce all the chlorine to hydrochloric acid, the sulphur dioxide will then react with some chlorine dioxide. The hydrochloric and sulphuric acids appear in the chlorine dioxide solution.

Scrubber Installation

This difficulty was overcome by installing a scrubber on top of the generator consisting of a small tower packed with Raschig rings (Figure 2). The scrubber is designed in such a way that the chlorate solution passes down the packing on its way into the generator while the gas passing upward through the packing is scrubbed by the chlorate solution. In this way no acid is carried from the generator into the absorption tower.

The scrubber then serves the purpose of returning to the generator the hydrochloric acid produced by reaction between chlorine and sulphur dioxide, along with the sulphuric acid formed in the same reaction. This chloride helps maintain the chloride concentration in the generator, making it unnecessary to reduce chlorate to chloride for this purpose. Therefore the efficiency of the process is improved by one or two per cent.

The same phenomenon of sulphur dioxide escaping from the generator liquid has been found in all commercial installations so far tested. In fact all Mathieson generators, when proper analytical methods are used, have been shown to produce chlorine dioxide free, or nearly free of chlorine, but containing some hydrochloric acid. Therefore for the newer Canadian installations, Electric Reduction Co. of Canada has designed a scrubber which has brought about the expected slight improvement in efficiency.[15]

Secondary Generator

For economic operation of the Mathieson process the concentration of chlorate in the generator must be maintained between 10 and 20 gm. per liter, depending on the production rate. If the chlorate concentration is dropped below this level, the efficiency is significantly lowered, because the chloride concentration must be increased to maintain the production rate. Since the effluent from the generator normally is wasted, 20 gm. per liter chlorate solution flowing out of the generator represents a loss of about five per cent of the ingoing chlorate. To recover part of this chlorate as chlorine dioxide, Electric Reduction Co. of Canada has designed a small secondary generator into which the effluent from the main generator flows by gravity. By means of a single porous plate and one draught tube a stream of sulphur dioxide is introduced into the secondary generator, producing chlorine dioxide at somewhat reduced efficiency, but almost stripping the solution of sodium chlorate (Figure 2).

The gas from the secondary generator goes to the top of the primary generator to be mixed with the gas produced there. If there is any excess sulphur dioxide or extra chlorine in the gas from the secondary generator they will react with either chlorine or sulphur dioxide in the primary generator gas, and the hydrochloric and sulphuric acids so formed will be scrubbed out of the gas in the scrubber and returned to the system. Thus the combination of the secondary generator and the scrubber produces chlorine dioxide with the maximum possible efficiency.[15]

Improvement in the Solvay Process

The Solvay chlorine dioxide generator has been completely re-designed since the last comparison of processes was made. The three packed towers in which the sulphuric acid solution containing chlorate and methanol was circulated provided many operating problems, especially the maintenance of the pumps circulating the extremely corrosive liquid.[8] They have now been replaced by two jacketted lead-lined steel reaction vessels operated in series in cascade fashion, over-flowing by gravity from one to the other (Figure 3). Each vessel is agitated vigorously by an air stream, which also serves to remove the chlorine dioxide from the solution and carry it to the absorption tower at low partial pressure to prevent explosion.

Concentrated aqueous sodium chlorate solution, methanol, and concentrated sulphuric acid are metered into the first reactor and immediately mixed with the generator liquor due to the vigorous agitation. Chlorine dioxide is produced at a constant rate in this solution which is maintained in a steady state at about 100 g.p.l. sodium chlorate and 9 normal sulphuric acid. The solution overflows to the second generator which is maintained in a different steady state, with lower chlorate concentration, perhaps 10 to 20 g.p.l., by adding methanol continuously.

Since most of the reaction takes place in the first generator, it is necessary to circulate cool water through the jacket to maintain about 140°F. Since the smaller portion of the reaction takes place in the second generator, it is usually necessary to add heat to the second generator to keep it about 145°F.

This new design of the Solvay process has improved the efficiency of its operation. With careful control of all variables at their optimum values it is possible to obtain 90 per cent efficiency.

Day-Kesting Process

A Day-Kesting plant integrating manufacture of sodium chlorate and chlorine dioxide has been built at Berlin, N. H., for Brown Co., incorporating several improvements over the similar European plants.[16] The chief improvement is the use of one large common storage tank from which the sodium chlorate solution is circulated rapidly through the electrolytic cells for oxidation of chloride to chlorate (Figure 4). From the same tank the solution is also circulated at a very slow rate through the six ClO_2 reactors arranged in cascade fashion. A large part of the chlorate in the solution is reduced to chloride by reaction with HCl forming chlorine dioxide and chlorine, and the partially exhausted sodium chlorate solution is returned to the storage tank and mixed with the main solution.

The electrolytic cells are about two-thirds larger and the chlorine dioxide reactors three times larger than those in Europe, decreasing the number required to 20 cells and six reactors for the production of 1½ tons of ClO_2 per day.

This process has not been widely adopted because of the high capital investment required. Although the chlorine dioxide is cheaper than that made from purchased chlorate, the pay-out time required to recover the original capital is longer than pulp companies are apparently willing to accept.

Columbia-Southern Process

The Persson process has been investigated thoroughly by Columbia Southern Chemical Corp. and redesigned to make a new process with some novel features (Figure 5)[17]. It is proposed to remove the chlorine dioxide from the generating liquor by steam instead of air. At first sight this does not seem feasible, since chlorine dioxide normally decomposes spontaneously at 100°C. However, the concentration of chlorine dioxide in the steam is kept low enough to prevent this decomposition. It is therefore suggested that the chlorine dioxide can be used directly with the pulp instead of dissolving the chlorine dioxide in water solution before mixing with the pulp. If the steam and chlorine dioxide can be added to the pulp simultaneously in this manner it would avoid the dilution of the stock by a large amount of cold water. However, abandoning the storage tank would involve some operating problems, since the chlorine dioxide production would have to be very accurately balanced with the pulp production, and there would be no surge capacity to make up for any lost time in the chlorine dioxide plant.

The Columbia Southern process uses a single generator instead of the four normally provided in the Persson process. An excess of trivalent chromium is used to convert all the chlorate in a single pass through the generator, but this creates some difficulties in the crystallizing system, which is an essential part of the process.

Absorption Towers

Many chlorine dioxide plants have been built with absorption towers of too large diameter to operate efficiently at the water and gas flow rates required for the normal production rate of the generator. Since packed absorption towers have a relatively narrow optimum operating range in this application, significant amounts of chlorine dioxide escape from some towers. This loss is increased sharply when the plant is operated at less than its maximum rate. One 24 in. diameter tower is adequate for four tons ClO_2 per day. At one ton per day it is to big.

Therefore two absorption towers of different diameter should be provided to give three optimum operating rates, with one or the other tower, or with both in parallel.

Materials of Construction

The experience with respect to materials of construction for chlorine dioxide production and bleaching in 27 pulp mills has been reported recently by W. H. Rapson and R. J. Neale[18]. Homogeneously lead-lined steel has been most widely used for chlorine dioxide generators, but a recent installation of glass-lined steel appears to be satisfactory. For piping, glass, glass-lined steel, saran-lined steel and unplasticized polyvinyl chloride have been found satisfactory. For pumps Durichlor, Worthite and Ircamet are widely used. Saunders-type valves with saran-lined or glass-lined steel bodies and Teflon or Kel-F diaphragms are most common.

The biggest corrosion problem in using chlorine dioxide has been the equipment for mixing it with the hot pulp. Although titanium is expensive, it is the only material that seems to give long life in this application. A recent development has been stainless steel mixers coated with fiberglass and polyester resin.

Bleaching with Chlorine Dioxide

Improvements in equipment and processes which make chlorine dioxide more cheaply are very important to the pulp and paper industry. This bleaching agent is unique in its ability to bleach pulp very white without damaging the strength of paper made from the pulp, and without introducing carbonyl groups into the cellulose molecules which cause the white pulp to become yellow with age[19, 20].

The modern trend in bleaching is to eliminate hypochlorite altogether and bleach in five stages with chlorine, caustic soda, chlorine dioxide, caustic soda and chlorine dioxide. These five treatments, applied under suitable conditions for each, bleach kraft pulps, soda pulps, sulphite pulps and neutral sulphite pulps to a new level of whiteness, color stability, strength and uniformity which has created a higher standard for pulps in the paper industry.

References

(1) Williamson, H. V., and Hampel, C. A., U. S. Pat. 2,683,651 (July 13, 1954); **Chem. Engineering,** 61,278 (1954).

(2) Alper, N., paper presented at Ann. Meeting T.A.P.P.I., Feb. 1958.

(3) Rapson, W. H., **Tappi** 37,129 (1954).

(4) Rapson, W. H., and Wayman, M., U. S. pat. 2,481,241 (1949), Can. pat. 406,815 (1950); **Pulp and Paper Mag. Can.,** Vol. 55, No. 6, 92-96, April 1954.

(5) Holst, T. G., **U. S. Pat.** 2,373,830 (1945).

(6) Woodside, V., and MacLeod, K. S., **Paper Trade J.,** Aug. 21, 1953.

(7) Persson, S. H., **U. S. Pat.** 2,376,-935 (1945).

(8) Schuber, J., and Kraske, W. A., **Chem. Eng.** 60,205 (1953).

(9) Day, G. A., and Fenn, E. F., U. S. pat. 2,484,402 (1949); Kesting E., **Tappi,** 39,554 (1956).

(10) Rapson, W. H., **Tappi,** 39,554 (1956).

(11) Rapson, W. H., **Tappi,** 41,181 (1958).

(12) Rapson, W. H., **Can. Pat.** 543,589 (July 16, 1957).

(13) Northgraves, W. W., Nicolaisen, B. H., Dexter, T. H., Jaska, D. J., **Paper Mill News** 79, 10-13 (1956).

(14) Rapson, W. H., and Wayman, M., **U. S. Pat.** 2,481,241 (1949); **Can. pat.** 466,816 (1950).

(15) **Pulp and Paper,** March 1958, p. 60.

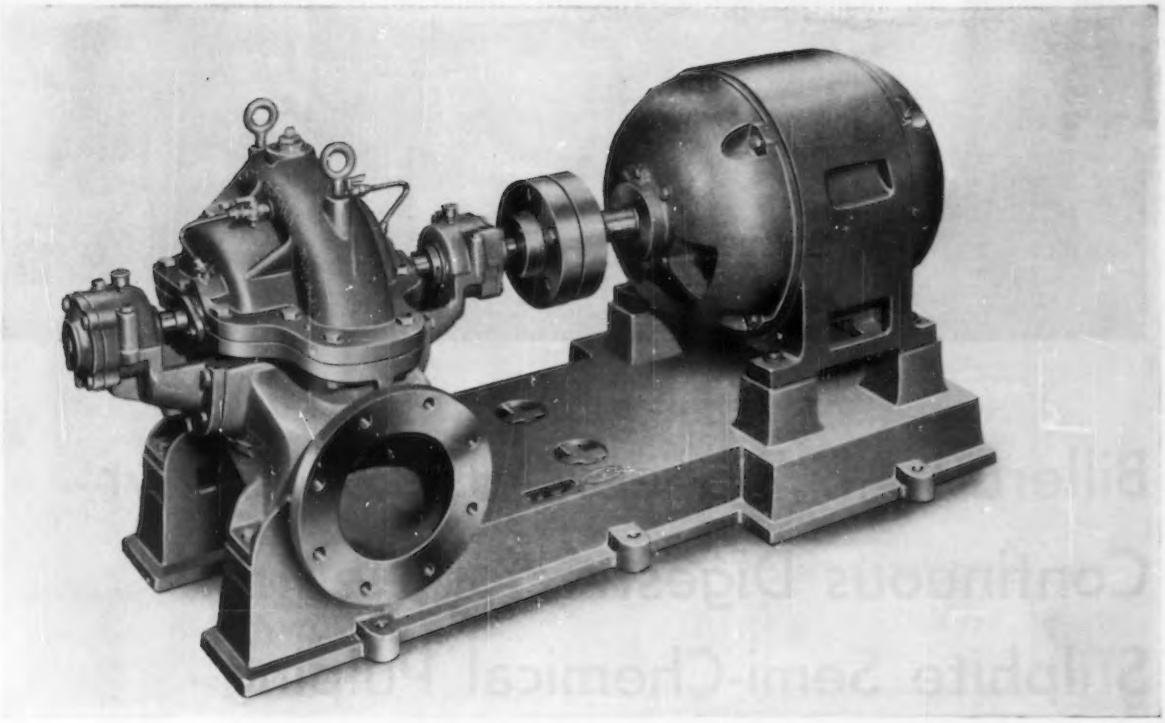
(16) Evans, J. C. W., **Paper Trade J.,** Feb. 18,1957, p. 44.

(17) Conrad, P., and Gordon, C., **Pulp and Paper Mag. Can.,** Oct. 1957. p. 160.

(18) Rapson, W. H., and Neale, R. J., **Pulp and Paper Magazine** of **Canada,** Nov. 1957, p. 135.

(19) Rapson, W. H., and Hakim, K. A., **Pulp and Paper Mag. Can.,** July 1957, p. 151.

(20) Rapson, W. H., Anderson, C. B., and King, G. F., **Tappi** 41,442 (1958).



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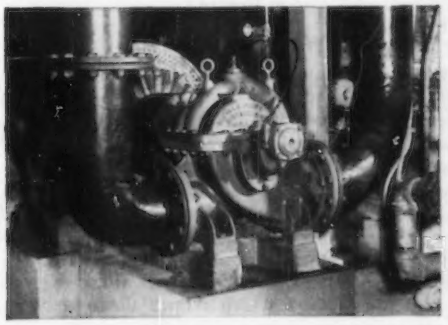

"Buffalo" No. 8 "SL" Pump for White Water Service. Shows quickly removable upper section of casing to facilitate inspection. Also note clean lines of suction p'ping.

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A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

Billerud AB Pioneers Use of Kamyr Continuous Digester for Neutral Sulphite Semi-Chemical Pulping

Technical details of the plant and operations were supplied by Hans Johnson, chief chemist, and Birger Olsson superintendent of the semi-chemical pulp mill.

Eben M. Whitcomb,
Editor-in-Europe,
Paper Trade Journal

First installation anywhere of a Kamyr continuous digester on NSSC pulp was made at the Billerud Co. in Säffle, Sweden last year. When the author visited the mill this past summer, the unit was operating at 40 tons per day, being limited to this by waste liquor disposal problem. No troubles are experienced with pulp quality following the solution of original difficulties, as discussed later.

The Billerud Co. was founded in 1883 at Säffle, in the province of Värmland, one of the most heavily wooded areas of the world. Billerud now operates on a sustained yield basis five pulp and paper mills, namely at Billerud, Gruvön, Kyrkebyn, Slottsbron and Jössefors in addition to three sawmills. In the mills and in 25 power stations, the company employs about 5000 people who produce 100,000 tons of dissolving pulp, 85,000 tons of kraft, greaseproof and pergamyn annually. 300 tons of turpentine and 500 tons of acetone are also made by the byproduct plants.

As a result of research work done by their own extensive laboratories, Billerud three years ago made the decision to expand production using the neutral sulphite semi-chemical process. Laboratory work indicated the process should incorporate the advantages of the Kamyr continuous digester and be used for pulping birch. That plant is today successfully in operation. Pulp produced is further improved by bleaching and is used entirely in their own paper production. It is claimed that pulp quality so produced at a total bleached yield of 57-58 percent is competitive with pulps produced by other chemical processes. Recently the Wiggins-Teape Group has introduced a similar operation in England.*

Wood Supply

Logs are delivered for the NSSC operation by truck. Generally the wood is received in tree lengths and is handled in and out of the wood yard in steel strapped bundles, of about 15 tons, by 15 overhead drag lines.

From the storage yard the bundles of logs are placed in a "hot pond" where they are broken open and fed to a conveyor which carries them over slasher saws which reduce them to two meter

* See Mr. Whitcomb's article on the English installation in our November 24, 1958 issue. Due to a snafu in the mails the present article was "lost" for several months, although it was written before he saw the British job.

Flow sheet by W. N. Perry, staff artist.

WASHER
STORAGE
BIFFAR SCREEN
REJECTS
CHLORINATION
CAUSTIC EXTRACTION
HYPOCHLORITE 1ST STAGE
HYPOCHLORITE 2ND STAGE
SPROUT-WALDRON REFINER
PAVENPORT PRESS
SCREW CONVEYOR
BLOW TANK
SPENT LIQUOR ORIFICE
DISK STRAINER
KAMYR CONTINUOUS DIGESTER
HEATER
HEATER
COOLING WATER
LIQUID STORAGE
SULPHITE ABSORBTION
ROTAMETER
HIGH PRESSURE PUMP
SCRUBBER
AFTER BURNER
ROTARY SULPHUR BURNER
HIGH PRESSURE FEEDER
LOW PRESS. FEEDER
STEAMING VESSEL
CHIP TANK
NaOH (LIQUID)
TO PAPER MACHINES
4 STAGE CENTRIFUGAL CLEANERS

(about six feet) lengths. The logs are then fed to one of two drum barkers and thence to a rubber belt sorting conveyor where operators recycle poorly barked wood back to the drums. There is no splitter necessary as all large diameter trees are removed for saw logs rather than pulping. The prepared logs are then conveyed to a four knife K.M.W. chipper and are reduced to chips.

Hardwood and softwood are processed separately in the woodroom. After screening, the chips produced are carried by a bucket conveyor to chip storage bins. Chips are removed from the bottom of the storage bins by a remotely controlled screw. This supplies an inclined belt conveyor which supplies the five calcium base sulphite digesters with softwood chips and replenishes Kamyr continuous digester supply bin with hardwood.

Cooking Liquor

Cooking liquor is manufactured by utilizing a part of the SO_2 gas prepared in rotary sulphur burners for the sulphite acid plant. This gas under pressure is passed through a stainless steel tower (fabricated by Billerud) and absorbed in a sodium hydroxide solution. Counterflow of the gas and liquid are accomplished by three perforated decks within the tower, each of which is packed with Rashig rings. Additional counterflow of weak liquor is maintained by bleeding the discharge line. Recirculation of liquor and caustic makeup is controlled by rotameter so that cooking liquor is produced at a pH of about 12 and with the following specifications:

25 grams / liter SO_2
38 " " NaOH

Prepared liquor is stored in a 100 cubic meter storage tank ahead of the digester.

Cooking Procedure

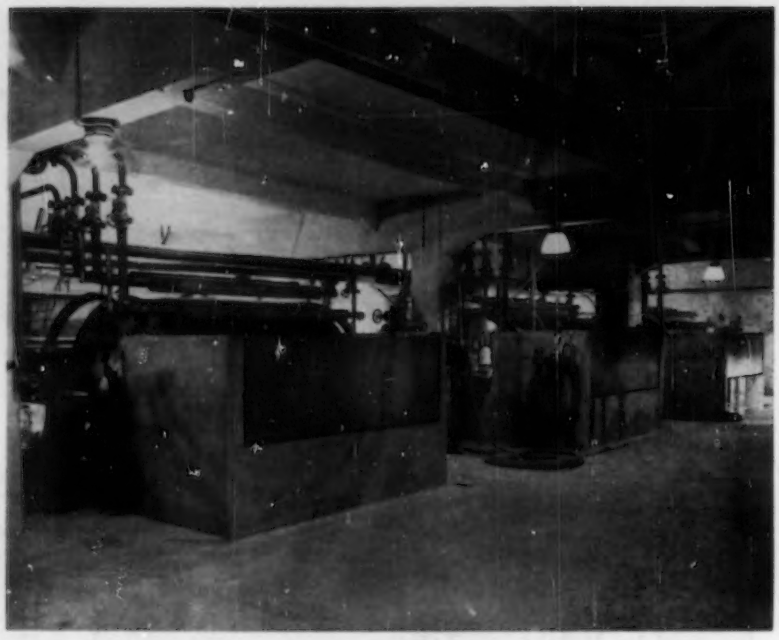
Cooking at present is being carried on at a rate of 40 tons of unbleached pulp per day. Digester capacity is 80 tons, but because of the waste liquor disposal problem here, the production must be held down until the recovery problem has been solved.

The chip tank, low pressure feeder, steaming vessel, high pressure feeder are all of conventional Kamyr design and operation. Pre-heating is carried out at 14-15 pounds per square inch and chips are fed into the top of the digester through a rotary valve by cooking liquor under pressure.

Single Cooking Zone

Within the digester cooking is completed within a single heat zone rather than a double zone as in conventional types. Liquor is heated indirectly by one of two heat exchangers, the remaining one being a spare. Retention time at the 40 ton production rate is about seven hours. Pressure in the cook zone is approximately 156 pounds/sq. in. (11 atms.) at 162°C. Cold water is introduced at the lower area of the digester to reduce stock temperature to 125°C. before it reaches the disk strainer. Flow of cooked chips in this section is facilitated by recirculation of spent liquor. Power requirements of the agitator within the disk strainer provide a signal to control the amount of recirculation and the resultant consistency to the blow tank. An Asplund defibrator which was originally installed directly after the digester has been removed permitting the cooked chips to go directly to the disk strainer and through an orifice to the blow tank. The orifice size for cooked chips at this production level is approximately 10 x 20 mm.

From the blow tank, the stock goes to a Davenport press. Next, the thickened stock is transferred by a screw-conveyor to a Sprout-Waldron disk refiner.



Three Kamyr washers are used in three (or is it four?) bleaching stages.

Screen Room

Refined stock from the cooking area passes through a Biffar screen, rejects from which are returned for further refining. Unbleached pulp at this point has a Roe number (demand in grams of Cl_2 per 100 grams sample in 20 minutes at 20°C.) of 15 and is obtained at a yield of 73-74 percent. This can be compared with a value of 5.5 for unbleached calcium base sulphite.

Bleach Plant

The sulphite and NSSC bleach plants operate in parallel and from the same master control panel. Washed fiber from Lindblad rotary thickeners is introduced at three percent consistency to a three stage* Kamyr bleach system. Chlorination and caustic extraction stages are of conventional design while the final (calcium base) hypochlorite stage is divided into two sections without washing in between. It is felt that by so dividing the process finer control of bleaching can be maintained. After final centrifugal cleaning and washing the pulp is ready to be slushed to the beater room and paper machines.

The production of paper at Säffle is confined to greaseproof, glassine and sulphite wrapping. Hardwood pulp produced by the NSSC process is used in amounts of about 50 percent in bleached papers and 20 percent in unbleached papers, with excellent results.

Troubles Experienced

Original expectations for physical tests on pulp were not realized in initial production and it was discovered that by cooling the pulp within the digester before blowing, and by not defibering the stock at the cooking temperature, the strength of the pulp was greatly improved.

* Editors note—Does the elimination of a washer reduce the number of stages?

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Experimental Map Papers Containing Synthetic Fibers Show Enhanced Strength and Dimensional Stability

Synthetic fibers added to paper stock considerably enhance the strength characteristics of map paper, according to a National Bureau of Standards evaluation for the Army Engineer Research and Development Laboratories. Of the different fibers investigated, polyesters give the best dimensional stability—a prime requisite in military map paper. Paper containing polyamide fibers has excellent folding, tearing, and bursting strengths, but low dimensional stability. The evaluation was made by comparing test results with results from similar tests on conventional paper stocks.

Tests for dimensional stability, folding endurance, and bursting and tearing strengths were made on specimens of three experimental handsheets and two commercially produced papers. Results show that a polyester-cellulose sheet has high dimensional stability, a pre-requisite for military map paper, and better strength properties than commercial map paper. A paper containing polyamide fibers has low dimensional stability, but exceptional folding, tearing, and bursting strengths. **(1)**

For many years the Bureau has conducted research on the properties of paper and related materials. In previous experiments a dimensionally stable paper, that is, a paper with low moisture expansivity, was developed by laminating two thin sheets to a backing of polyester film. **(2)** G. L. McLeod of the Bureau staff undertook the present study to find out whether synthetic fibers with less affinity for water than cellulose could impart the desired moisture stability to map paper.

Hand-made Papers

Initial attempts to prepare handsheets from a suspension containing 100 per cent synthetic fibers were unsuccessful. The sheets tore and disintegrated when removed from the mold. A suspension was then prepared containing cellulose fibers and synthetic fibers in a 1-to-3 proportion. From this suspension it was possible to produce handsheets that could be manipulated and treated with an acrylic binding agent. The sheets were dried for one hour in a forced-air oven, and cured in a flat-bed press at 160°C with a pressure of 300 lb/square inch for 45 seconds. The synthetic fibers in the three different handsheets were polyester, polyacrylate, and polyamide (nylon). Table 1 shows the results of tests on these handsheets compared with results obtained from all-cellulose sheets made with the same handsheet apparatus. **(3)**

Machine-made Papers

Similar tests were conducted on machine-made paper containing 40 per cent synthetic fiber, 40 per cent cellulose rag fiber, and 20 per cent acrylic binder. Only two of the synthetic fibers, polyester and polyamide, were used in the machine-made paper. Table 2 gives the results of these tests compared with identical tests on commercial map paper. Included in this table are the Federal specifications for map paper.

Test Results

In general, test results of the handsheets and the machine-made paper follow the same pattern. The polyester-cellulose sheets are superior in dimensional stability to moisture, and have higher bursting, folding, and tearing strengths than does regular map paper. The polyacrylic-cellulose sheets, tested only in the form of experimental handsheets, are superior to the polyamide-cellulose and the all-cellulose sheets in dimensional stability but inferior to the polyester-cellulose sheets. The polyamide-cellulose paper has the lowest dimensional stability of all of the papers tested, which makes it unsuitable for map paper. However, because of its exceptional folding endurance and high tearing strength, this paper may prove to be valuable for other purposes.

TABLE I—TEST RESULTS FROM HAND-MADE PAPERS

Tests performed	Test results: 50-50 cotton and linen waterleaf	75% nylon	75% poly acrylate	75% polyester
Basis weight (17 x 22–500), lb.	23.8	34.6	30.2	31.9
Thickness, in.	0.0054	0.0118	0.0059	0.0108
Expansivity for relative humidity change between 65 and 50%, %	——	0.25	0.037	0.014
Folding endurance, Schopper, double folds	Approx. 1200	100,000	4260	31,600
Bursting strength, points	46	122	86	76
Tensile strength, kg/15 mm.				
Dry	25.6	6.1	5.8	4.4
Wet	2.5	2.0	1.3	3.5
Tearing Strength, g.	156	864	323	590

TABLE II—TEST RESULTS FROM MACHINE-MADE PAPERS

Tests Performed	50:50 Polyester-rag	50:50 Nylon-rag	Commercial paper	Federal specification requirements[a]
Basis weight (17 x 22–500), lb.	26.2	22.6	23.7	24±5%
Expansivity for relative humidity change between 65 and 50%, %				
Machine direction	0.059	0.196	0.071	0.075 max.
Cross direction	0.10	0.28	0.21	0.25 max.
Brightness, %	83.1	82.1	71.7	70.1
Acidity, pH, hot extraction	4.8	5.7	5.0	4.5
Smoothness (Bekk), sec.	33	8	60	50-100
Water resistance, dry indicator, sec.	94	77	70	55
Thickness, in.	0.0052	0.0054	0.0041	0.0042±0.0005
Folding endurance, Schopper, double folds				
Machine direction	14,300	40,000	1410	1000
Cross direction	11,300	13,500	1300	1000
Bursting strength, points				
Dry	49	50	50	50
Wet	46	30	30	20
Tensile strength, dry, kg./15 mm.				
Machine direction	7.5	6.5	11.8	11.0
Cross direction	5.2	4.5	6.8	6.0
Tensile strength, wet, kg./15 mm.				
Machine direction	5.3	3.4	4.4	3.5
Cross direction	4.2	2.3	2.8	2.5
Tearing strength, g.				
Machine direction	151	168	85	95
Cross direction	141	108	94	95
Opacity, %	75.8	67.1	93.2	91.0

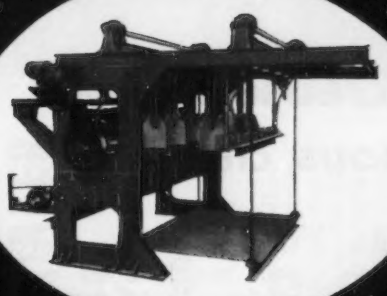
[a] All figures are minimum values unless otherwise designated.

No difficulties were encountered in printing on the synthetic-fiber papers, in either black and white, or in the regular five-color lithographic process used for Army maps. The smoothness and opacity ratings of the synthetic fiber sheets are lower than those of regular map paper, but these are minor deficiencies which can be easily overcome. That the synthetic-fiber papers have less dry tensile strength than commercial map paper is attributed to the low fiber-to-fiber bonding in the synthetics. Dry tensile strength, however, is a relatively unimportant factor in papers used for military maps.

References

For further technical details, see *(1)* Properties of some experimental map papers containing synthetic fibers, by G. L. McLeod, **TAPPI** *41*, 430 (1958). *(2)* Improved dimensional stability in laminated paper, by G. L. McLeod and Thelma L. Worksman, **TAPPI** (in press); and Improved map paper, NBS Tech. News Bul. *42*, 148 (1958). *(3)* Preparation of fiber test sheets, by M. B. Shaw, G. W. Bicking, and L. W. Snyder, **Paper Trade J.** *90*, No. 16: *T.S.* 69 (1930).

HAMBLET LAYBOYS



Single and Duplex Layboys for finishing room, board and pulp machine application. Supplied with tandem delivery for speeds to 300 feet per minute, overlapping delivery for speeds above 300 feet per minute. Handles tissue, blotting, envelope, and various weights of paper and board.

WRITE FOR CATALOG

HAMBLET MACHINE CO.
LAWRENCE MASSACHUSETTS

BANKRUPTCY SALE BY PUBLIC AUCTION

VICTORIA PAPER MILLS

FULTON, NEW YORK

Wed., Jan. 14, 1959 10:30 A.M. EST

FOUR MACHINE PAPER MILL

The entire assets of the Victoria Paper Mills, Fulton, N.Y. will be sold at public auction on the premises of company, commencing at 10:30 A.M. on the 14th of January, 1959, and continuing until all lots are disposed of.

REAL ESTATE:
Industrial buildings, approximately 40,000 square feet of space in four buildings, situated one-half block from downtown Fulton, including boiler heating system, electric lights, sprinkler system, adequate office facilities, connection to city sewage system, truck and railroad sidings on the New York Central Railroad. Buildings have been maintained and are in good repair.

FOUR MACHINE PAPER MILL:
ONE YANKEE FOURDRINIER
TWO-72" CYLINDER MACHINES
ONE STRAIGHT FOURDRINIER
ONE COMPLETE PAPER MILL MACHINE SHOP
Four paper machines, two single cylinder 72" trim machines, one 81" trim, maximum 84" trim, Yankee Fourdrinier Machine, long wire, one straight Fourdrinier Machine, fourteen dryers—81" trim, all machines were running until June 1, 1958 and have been maintained by engineers since—rolls turned, all beaters, jordans and boxes filled with water, all now in A-1 condition. With machines is wide assortment of auxiliary equipment, convertible to use for any paper machine, and capable of immediate production with all auxiliaries in A-1 condition.
beaters screens pumps motors boilers drives valves controls electronic equipment filters 2 tow motors electrical equipment rolls instruments trucks testing equipment welding equipment

MACHINE SHOP:
Completely equipped, capable of making any part or parts used in any paper mill, up to 32" diameter rolls.

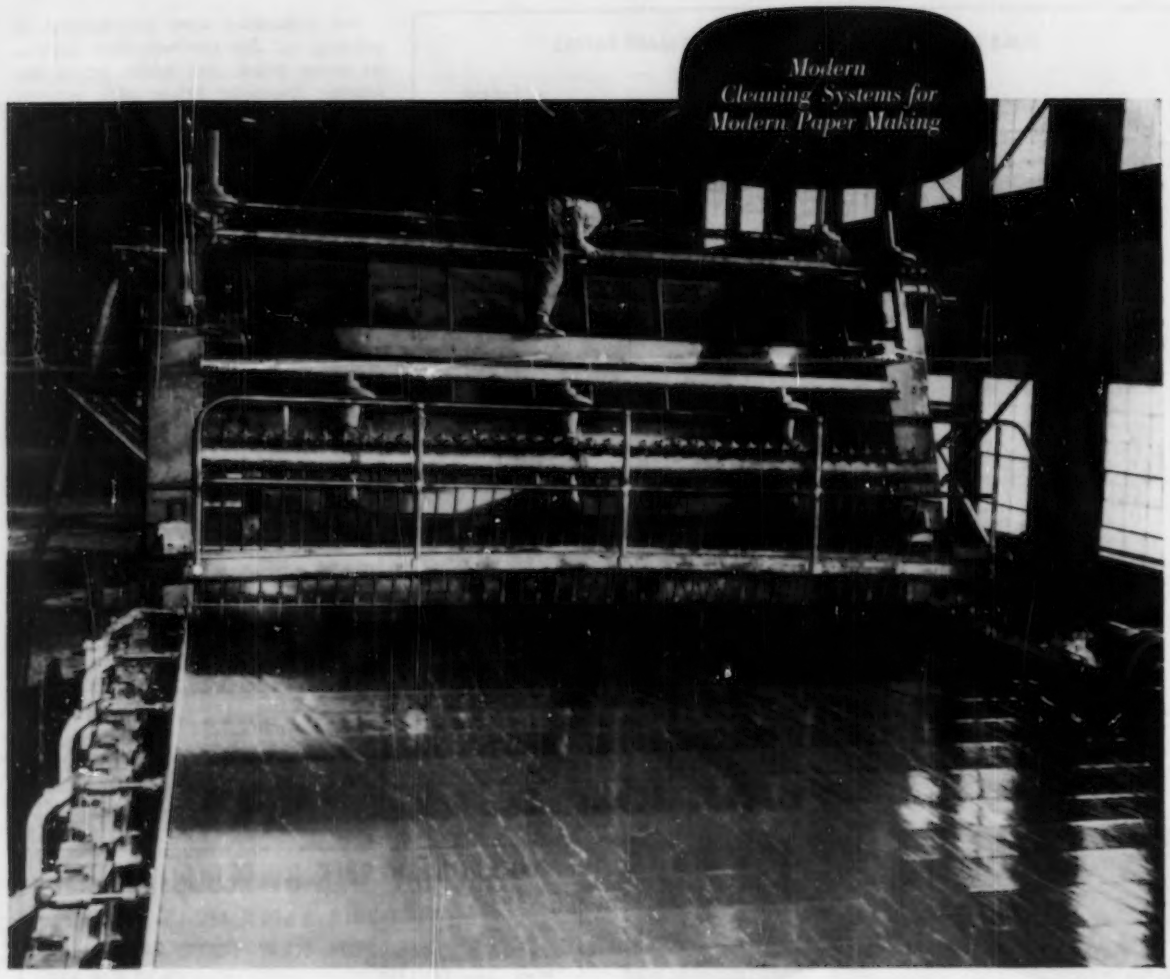
COMPLETELY EQUIPPED BOILER ROOM—LATEST ELECTRONIC BOILER CONTROLS

OFFICE FURNITURE:
Adding machines, typewriters, desks, executive chairs, filing cabinets.

Sale will be conducted by H. Meltzer & Sons, Auctioneers, Cicero, N. Y. by order of the Hon. David J. Goldstein, U.S. Refree in Bankruptcy, U.S. District Court, Utica, N.Y.

Mill will be open for your inspection from Monday, January 5th, 10:00 A.M. to 5 P.M., until day of sale.

For a brochure of sale or an appointment to inspect, call or write Victoria Paper Mills, Fulton, N.Y.—Phone Lyric 2-4204 or H. Meltzer & Sons, Cicero, N.Y.—Phone Owen 9-5461 or Syracuse, N.Y. Gibson 6-2114 or Gibson 6-2908.



Fourdrinier wire life increased 40% by mechanized continuous cleaning

Changing Fourdrinier wires about every 20 days cost one mill over $13,000 yearly.

Mechanizing the wire cleaning and using Oakite Compound 85 made a big difference. Now, the wires average 28 days—a 40% increase in life. Savings: about $5,000 yearly in wire costs alone, *plus* the time and work saved with fewer changeovers.

How it was done. On recommendation of the Oakite man, the mill adopted an in-place cleaning system using Oakite Compound 85. The wire is cleaned without manual brushing. Results: wire is thoroughly cleaned. It's replaced only because it fails mechanically, never because of cleaning damage. In fact, the wire supplier remarked he'd never seen wire returned in such good shape.

How you can benefit. Ask your Oakite man to help you cut cleaning costs, too. He's well qualified to help you develop time-and-money-saving cleaning *systems.*

Call him in; or write for Bulletin B-4591. Oakite Products, Inc., 68 Rector Street, New York 6, New York.

Technical Service Representatives in Principal Cities of U. S. and Canada
Export Division Cable Address: Oakite

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS · METHODS · SERVICE
SCIENCE
in our 50th year

Modern Cleaning Systems
Keep Downtime DOWN

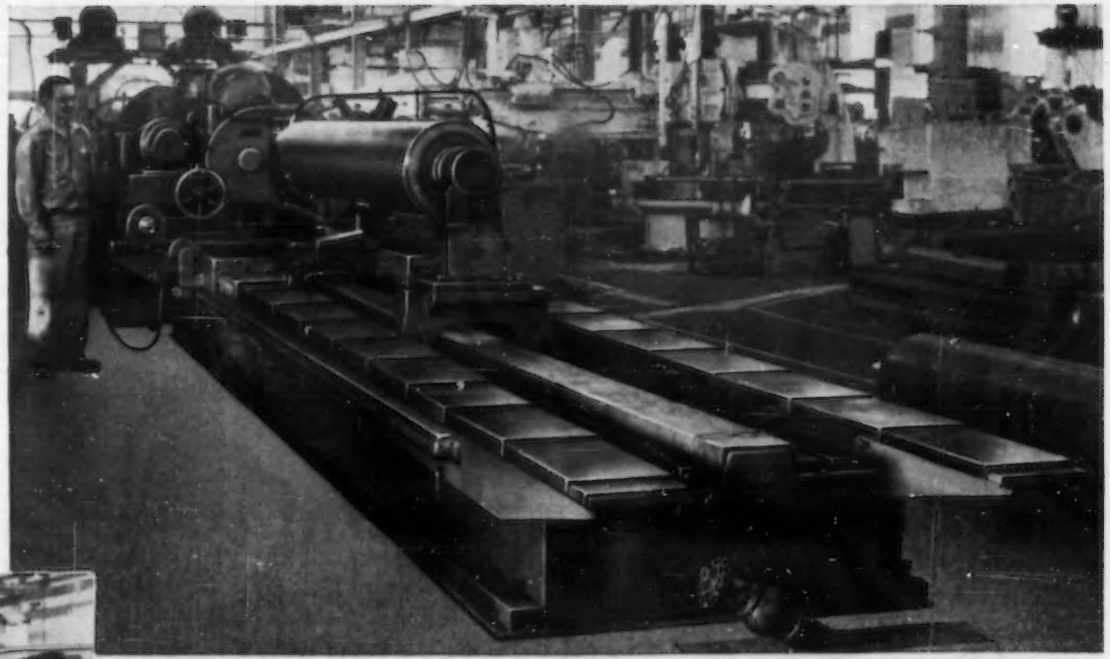
LOBDELL GRINDER

—Latest Addition to Sandy Hill's 10 Year Expansion Program

A Lobdell Roll Grinder, the most modern available, is Sandy Hill's newest acquisition in a ten year retooling program now nearing completion. It will accommodate rolls from 6 inches to 8 feet in diameter.

Sandy Hill has had long experience in studying and recommending proper crowning for rolls in each paper machine section. Now a newly designed crowning device incorporated in the new Lobdell Roll Grinder gives a full range of desirable crown curves.

An automatic wheel infeed compensates for wheel wear on chilled iron to eliminate the inaccuracies that are the most common cause of uneven caliper in the finished paper sheet.



- Massive bed and carriage construction.
- Inverted Vee-ways . . . stronger, better lubricated.
- Crowning device . . . designed to give full range of desired crown curves.
- Choice of A.C. or D.C. electrical equipment to suit your mill needs.
- Quick wheel change made easy with grinding wheel mounted on end of wheel spindle.
- Full way protection with metallic telescoping covers.
- Handwheel control on side of wheel-head permits observation of work while feeding wheel.
- Coarse and fine feed of wheel at operator's choice.
- Automatic wheel infeed to compensate for wheel wear on chilled iron.
- Self-contained wheel spindle . . . forced feed lubrication with oil pressure control.

A New LOBDELL Roll Grinder Means FASTER GRINDING

plus:
- PRECISE CROWNING
- BETTER SURFACE FINISH
- MAXIMUM ACCURACY ON BOTH IRON AND RUBBER COVERED ROLLS

UNITED
ENGINEERING AND FOUNDRY CO., 948 FORT DUQUESNE BOULEVARD, PITTSBURGH, PENNA.

Paper and Board Industry—Outlook for 1959 and Review of 1958

Production in 1958 equalled that of 1957. Output of 32 million tons is predicted for next year which would constitute a new high.

Statistics on total paper and board production in 1958 are not yet available but they are expected to approximately equal the 1957 output of 30.7 million tons states the U. S. Dept. of Commerce in a year-end report. The all-time high production record of 1956, amounting to 31.4 million tons, was in part the result of inventory building following a comparatively tight supply situation in 1955 and the first half of 1956. In 1957 and early 1958, when supplies became more plentiful, there was evidence that converters, wholesale merchants, and consumers took steps toward reduction in inventory, thereby lessening demands upon the mills somewhat below actual consumption levels, continued the report.

For the first half of 1958, total paper and board production was 3.6 per cent below the same period of 1957. The upturn in general business activity starting about mid-1958 was accompanied by a definite upturn in demand for paper and board. Therefore, production increases for the last six months of 1958 are expected to bring the output for the entire year to a point about equal to the year 1957.

It is believed that by the end of 1958 inventories will be near normal in relation to consumption or sales. Thus, production in 1959 should be about parallel to actual consumption and closely follow the general upturn in business and economic activity. Paper and board production for 1959 is estimated at about 32.0 million tons, exceeding 1957 and 1958 by about four per cent, and about two per cent greater than the previous peak year of 1956.

Paper and board manufacturing in 1957, employed about 460,000 wage earners with wages of over $2.2 billion. Total value of sales in 1958 is estimated at about $11.0 billion.

Significant variations in year-to-year correlations with such economic indicators are usually due to special factors. For example, periods of paper and board inventory accumulation, such as occurred in 1956 when a tight supply situation prevailed, resulted in production being somewhat in excess of actual consumption. In other words, demand upon the producing mills was for both consumption and addition to inventory. In 1957 and early 1958, this situation was reversed when it became apparent that fully adequate supplies were available for delivery from the mills on comparatively short notice. Therefore, 1957 production was undoubtedly somewhat below actual consumption.

When the upturn in general business and economic activity became evident in mid-1958, there was a strong upturn in demand for most grades of paper and board to meet not only the actual increase in consumption but also to replenish inventories to more normal levels relative to sales or consumption. This situation is expected to result in 1958 production of paper and board totalling about 30.7 million tons, which will approximate the output in 1957. In 1956, the historic high record of 31.4 million tons was produced.

Imports and Exports

From the standpoint of foreign trade, imports of pulpwood, wood pulp, and newsprint are particularly significant. Of total United States consumption, pulpwood imports represent about 5 per cent; wood pulp imports about 9 per cent; and newsprint about 77 per cent. Imports of other grades represent only small quantities relative to U. S. production or consumption. Export markets for paper and board, and converted products, have shown a substantial upward trend in the past decade. In 1957, exports of these products totalled 868,000 tons. A decline in 1958 exports of about 3 or 4 per cent below 1957 is indicated. The outlook for exports in 1959 is uncertain but expected to hold at about 1958 levels.

Growth Patterns

Substantial new paper and board capacity additions in the last few years continued through 1957 and 1958. With demand leveling off in these two years, the ratios of production to capacity declined from the near-full capacity production of 1956. There is little question that this expanded capacity will be needed to meet the projected increases in future demands.

With keen competition prevailing, the industry has intensified research toward improved qualities, new products, and applications for paper and board, as well as long-term market analysis.

The trend toward vertical and horizontal integration continued through 1958. More and more pulp, paper, and board companies have enlarged their commercial timberland holdings with a view toward long-term pulpwood supplies. In addition to the production of wood pulp, paper and board, many companies have expanded into converting operations, especially in the field of containers and packaging. Horizontal integration is also apparent with growing product classification. Product diversification is viewed as giving greater production stability in times when demand fluctuates for specific products. Further, more emphasis is being placed upon plant modernization, improved operating efficiencies, and cost reductions in manufacturing and distribution.

1959 Outlook

The favorable outlook for the United States economy in 1959 points to a continued growth in demand and consumption of various grades of paper and board. It is estimated that 1959 paper and board production will reach about 32.0 million tons, about a four per cent increase over 1958 and 1957, and a two per cent increase over the all time high production in 1956, concluded the government statement.

Sales Manager of Std. Packaging Division

Appointment of Bill B. Broach as sales manager of the Gebhart Folding Box (Dayton) and Bradley & Gilbert (Louisville) divisions of Standard Packaging Corp. was announced by R. Carl Chandler, chairman of the corporation.

M. F. Neff, former sales manager for Gebhart, became manager of the division, following the resignation of his brother, Robert C. Neff, as president and general manager on Nov. 14.

New Plant in L.A.

Simpson Paper Co. of Everett, Washington has established a new converting plant in Los Angeles to manufacture ruled reams, fillers, tablets and allied stationery items. Production in the new facility located at 2856 South Vail Avenue was begun in December under the direction of G. H. LeCuyer, manager of the paper company's converting plants and sales manager for converted products. The operation consists of a ruling machine, trimmer, stripping machine, round corner cutters, paper drills and banding machines with attendant materials handling equipment installed in half of the available space.

U.S. Envelope Closing Worcester Plant

The home office of the United States Envelope Co. has announced the closing of one of its four Worcester plants, the Whitcomb Division employing a working force of 119.

The Company is the world's largest manufacturer of envelopes. It operates 15 divisions from coast to coast. The Whitcomb Division has been manufacturing envelopes since 1866.

The company gave as a reason for the closing the fact that the old building "does not lend itself to modernizing" and as a result, "the company is unable to continue manufacturing envelopes in it at costs comparable with those of its other divisions."

Major Changes at Holyoke

Walter R. Smith, manager of the Holyoke General Electric Co. plant for the past four years, has resigned to become production manager at National Blank Book Co.

Mr. Smith's successor at GE will be Max I. Alimansky, presently plant manager in Lynchburg, Va.

The announcements of these major personnel changes affecting two of Holyoke's industries were made jointly by GE and NBB.

President Elected at Envelope Co.

Directors of Curtis 1000, Inc., envelope manufacturer, have elected Henry Curtis president.

He will continue as general manager of the firm's seven plants, including one at Louisville.

Oneida Appoints Rep

Oneida Paper Products, Inc., Clifton, N. J. has announced the appointment of Charles C. Zatarain & Son as representatives in Louisiana, and parts of Alabama and Mississippi. Associated with Milprint, Inc., for many years before joining the Oneida organization.

Promotion at Gardner

William Tuttle, has been promoted to packing engineer with the Gardner Division, Diamond Gardner Corp.

J. V. Melton

Merchandising Council Board Elections

James V. Melton, vice president of the Pollack Paper Corp., was elected president and chairman of the Board of Directors of the Waxed Paper Merchandising Council, at the Council's annual meeting held here recently.

Harold E. Pierce, sales manager of the bakery packaging division of Marathon, a division of American Can Co., succeeds Mr. Melton as vice president and vice-chairman of the Board of Directors of the Council.

Mr. Melton replaces retiring president and chairman of the Board of Directors, Joseph C. Tobin of Crown Zellerbach Corp.

In a special report to members, John A. Egan, Council executive director reviewed the successful 1958 advertising and public relations program carried out by the Council.

NEW LITERATURE

Adaptioneered Live Bottom Bins

Describes and illustrates specially engineered storage tanks with bottoms to facilitate efficient discharge. Data Sheet. Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.

Cutting Trends

Includes two new and improved methods for manufacturing ultra precision grinding wheels for tool room use and for the grinding of crankshafts and camshafts. Also an article on the correct grinding and honing procedures for sharpening paper cutting knives. Issue No. 2. Simonds-Worden-White Co., 1101 Negley Place, Dayton 7, Ohio.

Essowax and Esso Waxes in Liquid Form

Essowax offers the wax user a choice of properties that will help him to control more exactly the quality of his product. Esso liquid waxes offer many advantages to the consumer of 2,500 gallons or more a month. Esso Standard Oil Co., Lubetext DG-4A1 and Lubetext DG-4A5. 15 West 51st Street, New York, N. Y.

Graver Tray Type Deaerating Heaters

Covers a variety of subjects including principles of deaeration; tray heater operation; standard heater design and applications; accessory equipment and design and fabrication of Graver tray utility heaters. Graver Water Conditioning Co., 216 West 14th Street, New York 11, N. Y.

How to Lithograph Coated Offset Paper

Written by Robert F. Reed, research consultant for the Lithographic Technical Foundation, the booklet is divided into 51 sections, including a coated paper trouble chart for ready reference. Pocket-size Manual. Kimberly-Clark Corp., Neenah, Wis.

McCannameter Pneumatic Stroke Controller

Specifically designed for use on the McCannameter, this pneumatic stroke controller operates in direct response to a 3-15 p.s.i.g. air signal and requires no additional source of supply air. Bulletin 304. Hills-McCanna Co., 4612 W. Touhy Ave., Chicago, Ill.

Nalcoag-Colloidal Silica

Describes the physical and chemical properties of Nalcoag, a colloidal silica, offered as an aqueous suspension of 15, 30, or 35 per cent silica. This is used for antiskid treatment and has potential use as an additive for strengthening paper and giving various surface characteristics. Bulletin K5. National Aluminate Corp., 6216 W. 66th Pl., Chicago 38, Ill.

Infilco Mixers

Discusses the theory of mixing and compares the range of operations of different types of mixing equipment. Also contains tables which assist in the selection of mixer size for any specific application. Infilco Inc., Tucson, Ariz.

Maintenance Hints Handbook

This 5 by 7-inch leatherette-bound manual is designed to provide a quick, complete and convenient guide to modern maintenance practices on all types of electrical equipment. Revised edition. Price $2.00. Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

Industry Relies on Dustube Collectors

Describes a wide range of industrial dust and fume producing processes that can be successfully controlled with the properly designed cloth or glass bag-type dust collectors. Bulletin 562-D. Wheelabrator Corp., 1243 S. Byrkit St., Mishawaka, Ind.

Iron Fireman Panel Control Systems

Includes dimensions, illustrations, special advantages, and selection chart for quick and easy specification of panel assemblies. Folder 5803-A. Fireman Mfg. Co., 3170 W. 106th St., Cleveland 11, Ohio.

Figures of the Week

PAPER PRODUCTION RATIO REPORT—American Paper & Pulp Assn. Figures

(Production as per cent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

1958	Nov. 15 91.5	Nov. 22 91.7	Nov. 29 86.5	Dec. 6 92.7r	Dec. 13 92.0
1957	Nov. 16 91.9	Nov. 23 92.7	Nov. 30 87.0	Dec. 7 91.1	Dec. 14 91.3

r Revised.

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1958	86.9	89.5	89.5	88.4	86.4‡	86.2‡	76.0‡	89.8‡	86.7‡	91.4‡	90.3‡	—	—
1957	94.2	97.0	97.1	94.0	94.6	93.3	75.6	90.7	86.0	93.0	90.7	81.5	90.9

‡ Preliminary.

COMPARATIVE YEARLY SUMMARIES

	1951	1952	1953	1954	1955	1956	1957	1958
Year to Date	99.6	90.7	93.7	92.3	95.9	98.5	91.1	87.0
Year Average	98.0	88.6	92.3	91.6	94.0	97.9	90.9	

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available.

PAPERBOARD OPERATING RATIOS†—National Paperboard Assn. Figures

COMPARATIVE WEEKLY SUMMARIES

1958	Nov. 15 94	Nov. 22 94	Nov. 29 88	Dec. 6 84	Dec. 13 94
1957	Nov. 16 94	Nov. 23 94	Nov. 30 86	Dec. 7 84	Dec. 14 92

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1958	80	86	88	84	84	86	76	93	90	95	92	—	—
1957	91	94	94	92	93	91	72	94	91	97	92	79	90

† *Percents of operation based on "Inch-Hours" reported on a 6-day basis.*

SUMMARY OF PAPERBOARD STATISTICS—National Paperboard Assn. Figures

ITEM	THIS WEEK ENDING Dec. 13, 1958	LAST WEEK ENDING Dec. 6, 1958	CUMULATIVE TO DATE Jan. 1 to Dec. 13, 1958
% Activity	94%	84%	87%
TOTAL	309,537	277,282	13,659,833
Liner	107,941	96,330	4,603,847
Corrugating Material	46,994	43,519	2,069,536
Chip & Filler Board	5,383	4,028	238,993
Total Containerboard	160,318	143,877	6,912,376
Folding	56,134	48,366	2,584,491
Set-Up	10,306	11,450	543,535
Special Food Board	28,705	23,518	1,257,568
Other	54,074	50,071	2,361,863
Total Boxboard	149,219	133,405	6,747,457
TOTAL ORDERS			
Received	275,370	344,015	
Unfilled End of Week	403,401	438,091	

New Cold-Water Soluble Caseins Have Interesting Properties

Manufacture of four new Protovac cold-water soluble caseins has been announced by the Borden Chemical Company. Unlike most conventional caseins, which after soaking and the addition of alkali, require up to 60 minutes of heating at from 130 to 180 degrees F., the new Borden products are said to require only 10 minutes of alkali soaking and about 30 minutes of mixing at only 60 to 80 degrees F. The rate of solution can be increased by use of a high-speed mixer, such as the Cowles Dissolver. High-speed mixing presents no foaming problems, Borden's reports. Use of the products eliminates the need for cooking equipment.

The four new caseins were designed for use in paper coatings, paints, inks, adhesives, leather and textile finishing, wax and asphalt emulsions, and as latex stabilizers and thickeners. They are being shipped in 100-pound paper bags, which may be stored safely for more than a year.

Properties and uses of the new caseins follow:

Complete solutions of PV-424 can be obtained at pH 9.0 in 10 minutes at 60 degrees F. It has a very low ash and free acid content, low bacteria count, low alkali requirement, and high adhesive strength. PV-424 may be dissolved by any of the standard alkalies. Solutions may be held two or three days without preservatives. Longer storage requires the use of the usual casein preservatives. The product is particularly useful as an adhesive for pigments in paper coatings and inks, as a latex stabilizer and thickener, and as a paint additive to provide good pigment dispersion, leveling, and brushability.

PV-428 is a sodium caseinate which is soluble in cold water with no additional alkali required. It is unique in that resulting solutions are of low pH at only 6.0. This low degree of alkalinity makes it particularly useful as an adhesive for metallic pigments. It also may be used as a latex stabilizer and pigment dispersant where low pH is required.

PV-430 is a low-foaming zinc casein. It requires the addition of ammonium hydroxide to obtain complete solution. On drying, the zinc casein film has excellent water resistance. No additives are required. It may be used wherever water-resistant films or coatings are required, either as a clear film or in paper coatings, paints, inks, and wax emulsions. Solutions of PV-430 have high viscosity and small amounts give considerable thickening when added to a latex. The product has excellent keeping qualities. Solutions usually may be held one to two weeks without preservatives. A unique feature of the product is that it does not swell in water.

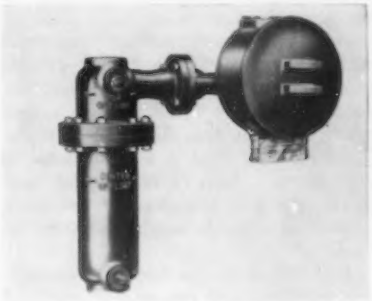
PV-800 is one of a series of biologically stable caseins; this product is of very low viscosity. Outstanding feature of PV-800 is that cold-cut solutions require no preservatives and may be kept for months without spoilage. Solutions are obtained by using any of the standard alkalies. Preservative action is built directly into the casein molecule and the preservative, therefore, does not migrate away from the casein in oil, wax, or asphalt systems. Cold-cut solutions prepared at 25 per cent solids have viscosity of only 400 centipoises. This makes it particularly useful in high solids paper coating.

PV-800 also is an excellent pigment dispersant. It has little thickening effect on latex, but it acts as an exceptionally good protective colloid. The product may be made water-resistant by using any of the standard procedures, such as treatment with formaldehyde or metallic salts. Tests indicate that it is not acutely toxic.

Additional information may be obtained from the Borden Chemical Company, Casein Department, 350 Madison Avenue, New York 17, N. Y.

Electronic Level Controller

In the field of liquid level control and measurement, Fisher Governor Co. engineers have designed an electric Level-Trol, called Type 2300. With electronic controls playing an increasingly important part in industry and process work, the Type 2300 has been designed with an eye to the future.

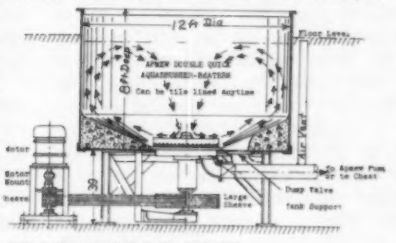


Using the conventional pneumatic Level-Trol cage and displacer float as the measuring element, it delivers a proportional 1 to 5 milliampere d.c. signal through a 3000 ohm load. Standard 117 volt alternating current is employed as the supply. Explosion-proof design and external adjustments for pro-

REPEAT ORDERING, APMEW UNIVERSAL PAPER PULP MILL for FREE CHINA, that PRODUCES HIGH QUALITY, STRONG LONG FIBRED PULP, like SULPHITE, with *HALF THE USUAL PRODUCTION COSTS*. SO AUTOMATICALLY SIMPLE AND COMPACT THAT IN 100 TONS DAILY CAPACITY, IT CAN BE PLACED ON NEW YORK STATE CANAL BARGE AND BE PORTABLE. CAN BE OPERATED BY SEVEN SCHOOL BOYS A SHIFT, AND CAN BE ERECTED BY 10 MEN IN 15 WEEKS AT *HALF THE USUAL MILL COST*. USES 4% OF THE POWER OF USUAL GROUNDWOOD MILL PRODUCING STRONG LONG FIBRES (like SULPHITE) MECHANICAL PULP, the OTHER 96% POWER IS MADE INTO PROFITABLE HYDRO-ELECTRIC POWER.

NEWSPRINT AND BOOK PAPER OF DOUBLE STRENGTH CAN BE MADE *WITHOUT SULPHITE* FROM APMEW LONGFIBRED MECHANICAL PULP, OR FROM APMEW LONGFIBRED CHEMICAL PULP AT HALF THE PRESENT PULP PRODUCTION COSTS.

USES THE SAME DEPENDABLE APMEW MACHINES used in 437 APMEW CLEAN STOCK PREPARATION SYSTEMS, used in 128 APMEW DE-INKING SYSTEMS, used in APMEW (GARBAGE & SEWAGE) FERTILIZER COMPOST MILLS. OBSERVE IT. 367 PATENTS. QUICK DELIVERIES.



APMEW, INC., P. O. BOX 1, GLENS FALLS, N. Y.

CHAS. T. MAIN, INC.
ENGINEERS
Process Studies, Design, Specifications and Construction Supervision
PULP AND PAPER MILLS
Steam, Hydraulic and Electrical Engineering
Reports, Consultation and Valuations
80 Federal Street Boston 10, Mass.

portional band and liquid level height render the Type 2300 suitable for use in hazardous locations.

The instrument utilizes a plug-in electronic converter with printed circuit, eliminating conventional leads and unnecessary wiring. There are no vacuum tubes. Silicon transistors and diodes are electronic components selected for reliability and trouble free service.

For more complete information write Fisher Governor Company, Marshalltown, Iowa.

Monorail Drive Unit Handles 5-Ton Loads

A new electric powered monorail drive unit called the "Uni-Tractor" has been introduced by the Becker Crane and Conveyor Company. Designed to provide powered travel for hoists or other load carriers along a monorail system, or across bridges, the drive unit will handle live loads up to five tons at travel speeds up to 2000 feet per minute.

A unique feature of the power unit is the fact that it will operate on any type of monorail system—I beam or patented track which has a clear under surface. Traction is obtained through a spring loaded, solid rubber drive wheel which runs on the underside of the track. Power is transmitted to the spring compressed drive wheel through a spur gear reduction unit. The precision cut gears are contained in a sealed housing running in a bath of oil. Forged steel trolley wheels mounted on pressure lubricated precision bearings support the unit.

Full magnetic type electrical controls are provided and the unit is operated from a push-button type pendant control. Current collectors can be provided or electric current can be supplied from the hoist using existing current pick-up facilities.

An interesting feature of the unit is the ease with which it can be attached to existing equipment using a simple bar type connection that may be supplied by the user.

For additional information write Becker Crane & Conveyor Company, 4900 Ridge Road, Cleveland, Ohio.

New Centrifugal Blowers Give Greater Efficiency

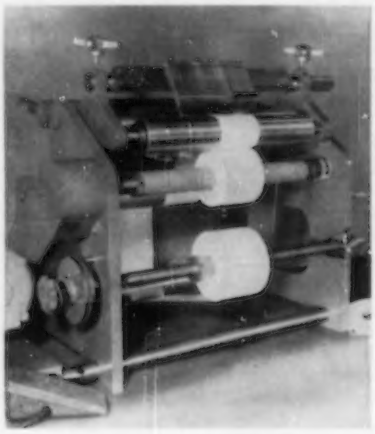
A new line of centrifugal blowers having a wide range of pressures and volumes has been announced by Joy Manufacturing Company. Sizes vary from 440 c.f.m. at ¼ inch static pressure for a single-width, single-inlet fan to more than 460,000 c.f.m. at 16 inches static pressure for a double-width, double-inlet fan.

Called Joy-Centrifoil fans these new blowers are an improved design over obsolete backward curved fans. The blades on these new blowers have an airfoil shape. The results according to Joy engineers are greater efficiency, silent operation and reduced horsepower.

The new Centrifoil fans meet all the requirements for commercial and industrial heating and ventilating applications as well as those of a forced or induced draft nature. For more information write: Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company, Ltd., Galt, Ontario.

Slits Thin Material into Narrow Widths

A new bench slitter capable of slitting extremely thin material into narrow widths is now on the market. Appleton Machine Co.'s BSR-18 bench model slitter is used on paper, synthetics and tissue. It's primarily intended for slitting small parent rolls—on short-run operations requiring a minimum of set-up time—into narrow widths.



The BSR-18 is designed for slitting vinyl plastics or coated unsupported fabrics up to 40 gage. Teflon, coated fabrics, polyethylene, leatherette, coated paper and condenser tissue as thin as .00025 inches can also be slit on this machine.

The slit material is rewound on a single rewind shaft without interleaving or fusing (narrow widths could not support themselves if rewound on a duplex principle). The bench slitter rewinds the material on rolls one next to the other across the entire face of the web during the complete operation.

The new machine slits as narrow as ⅛ inch with razor blades which can be set within .005 inch tolerance. For this type slitting, pre-set gang type holders are provided up to four inches wide. The new bench slitter operates on ½ h.p. three speed motor which can be plugged into any 110 volt A.C. light socket. Speeds range from 45 f.p.m. to 700 f.p.m.

For additional information write: Appleton Machine Co., Doven Division, Appleton, Wis.

Repair Kit Offered For PVC Tank Linings

Perma-Line Rubber Products Corp. has recently developed all the tools and accessories required to make any type of repairs on polyvinyl chloride linings of acid tanks. The tools can also be used to make repairs on plastisol coated plating racks and plastic duct work. Perma-Line is a company specializing in acid tank linings of all kinds. The tools now offered in the repair kit have been developed by the company through actual experience in their own shop. These are professional tools, identical in every respect to those Perma-Line uses in putting on the tank linings in the first place.

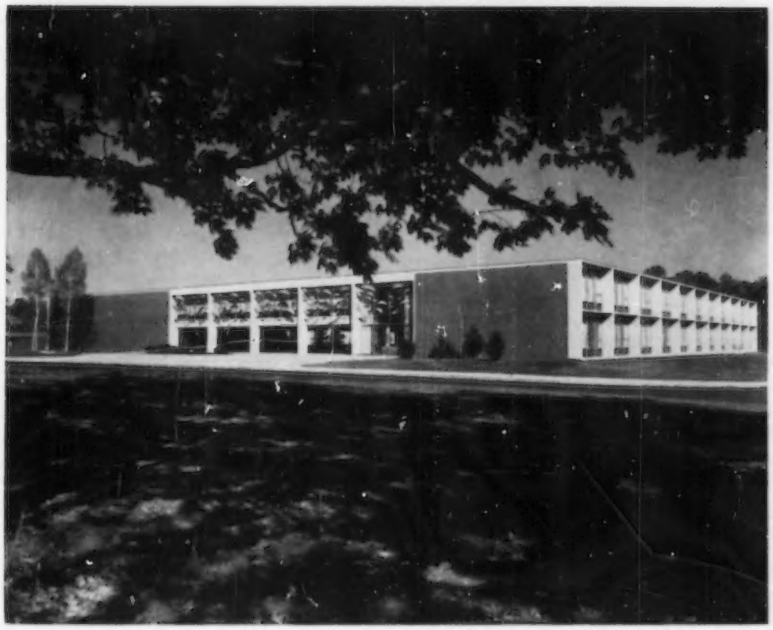
Perma-Line has found that most repair jobs that they have had to send service men out on can be handled quite simply when the correct tools are available. In a series of tests made with the kit, it was found that workers could effectively detect leaks and repair linings simply by following the directions which are included with the kit. The kit consists of a spark tester, a heat resistant stainless steel Permagun, dual seamer, stitcher, utility knife, and adequate supplies of cement, patching material and seaming material. Further information can be obtained by writing Perma-Line Rubber Products Corp., 1753 N. Winnebago Ave., Chicago 47, Ill.

Heavy Duty Guillotine

Introduction of a new 24 inch Jaco Autogil cutter is announced by Hobbs Manufacturing Company, which has hitherto distributed these heavy-duty automatic power-operated guillotines in the 5 inch and 15 inch widths.

The new 24 inch wide Autogil automatically measures and accurately cuts any pre-determined quantity of piece lengths from a coil of web material. Depending on the density of material, thicknesses the machine will cut range up to 3/16 inch. Hobbs states that effectiveness of the Autogil for any specific application can be readily and accurately determined by sample cuttings.

To meet varied demands, the new Autogil is available in two types. Type "S" has a range of fed increments, of infinite variation, from 0 to 8 inches long. Type "L" cuts pieces up to 96 inches in length. Full details are available from Hobbs Manufacturing Company, 26 Salisbury Street, Worcester, Mass.



Shown above upon completion of landscaping is the new international headquarters of Dorr-Oliver Inc., on Havemeyer Lane in Stamford, Conn. The new building, occupied by the company in June of this year, provides 120,000 square feet of office space for approximately 500 executive, administrative and financial staff, Sales Department and a majority of the company's technical divisions.

Arnold, Hoffman and Co. Inc., manufacturers of organic chemicals, will locate the Northern Sales Office at the company's home office building, 55 Canal Street, Providence, R. I. As of December 1, 1958.

Arthur C. Merrill, long experienced in other departments of Arnold, Hoffman, will assume the post of office manager for the Northern sales operation. All orders, correspondence, inquiries and other matters pertaining to Northern sales should be directed to the Providence address, Arnold, Hoffman states, and New England customers should use the Providence telephone service at GAspee 1-2935. A private Paterson, N. J. telephone connection—ARmory 8-1223—will be available to customers outside the New England area.

For the convenience of customers heretofore serviced from Arnold, Hoffman's New Jersey warehouse, Ahco will maintain warehouse stocks at Desmond's Warehouse, 824 Twenty-first Avenue, Paterson, N. J.

Parsons & Whittemore Graphic Corp., 250 Park Avenue, New York 17, distributor of Cerutti presses in the Western Hemisphere, announces that the Cerutti plant has opened new proof-testing and laboratory facilities for checking out presses prior to shipment with inks and materials similar to those actually used by the customer. Thus, the customer can inspect samples of work printed on his new machine under average production conditions and which he can use to measure the machine's performance in his own plant. In addition, Cerutti has announced plans for permanently installing a packaging press so that inks and materials can be constantly tested and evaluated and to permit research on problems submitted by its customers under average pressroom conditions. The new laboratory-pressroom facilities are part of Cerutti's expansion program begun six years ago, which has seen plant capacity increased by 25 per cent each year to accommodate the steadily mounting demand for Cerutti presses.

National Starch Products Inc., and **American Maize-Products Co.,** co-venturers in the project, announce development in research quantities of a new type of corn with extraordinary possibilities in the production of new types of starches with application in many industries, and of economic benefit to the nation's corn growers.

Preliminary research estimates of application of starch manufactured from the new corn, known as amylomaize, indicate the following possibilities in the near future:

1. Use in water soluble transparent film wrapping material for frozen foods, meats and other edible products as an advance in "built-in-maid service." Thus the housewife will be able to cook her meals without removing the wrappings, since the amylomaize wrapping materials will dissolve in the utensils as the contents are cooked. Since the film is made from corn, it becomes completely digestible when dissolved.

2. Use as a packaging material for water-dispersible products such as detergents, dyes, insecticides and industrial chemicals as replacement for the more expensive water-soluble synthetic films now used.

3. Use in non-water-soluble types for the coating and surface treatment of paper and paper products.

H. N. Lowell

W. R. Grace & Co. Harry N. Lowell has joined the Organic Chemicals sales department, Dewey and Almy Chemical Division. He will assist Charles E. Brookes, sales manager, in special projects.

Mr. Lowell was formerly a member of the Dewey and Almy's marketing research department, specializing in organic chemicals. He has also served in the commercial research department, Bethlehem Steel Co. He received a B.S. in business administration from the Massachusetts Institute of Technology in 1951. Mr. Lowell is a member of the Boston Chapter, American Marketing Assn.

Hamlin & Morrison, Philadelphia, Pa., P. L. Morrison has assumed ownership of this firm, located at 216 S. Second St. Hamlin & Morrison, established in 1892, are certified wood pulp testers.

Allistair Dunn

Ohio Injector Co. Allistair Dunn has been named to head manufacturing operations as director of manufacturing, under a newly aligned production organization grouping, B. F. Miller, vice president-manufacturing, announced. Dunn comes from Blackhawk Manufacturing Co., Milwaukee, where he held a similar post. In another move, Verland W. Belt, plant superintendent at facilities here, was named manager of The Ohio Products Co., Orrville, a subsidiary.

Mr. Dunn announced that the manufacturing organization is being broadened to regroup management functions to include separately directed manufacturing and industrial engineering. To the newly created posts he named John T. Lesko and Malcolm K. Sheppard, Jr.

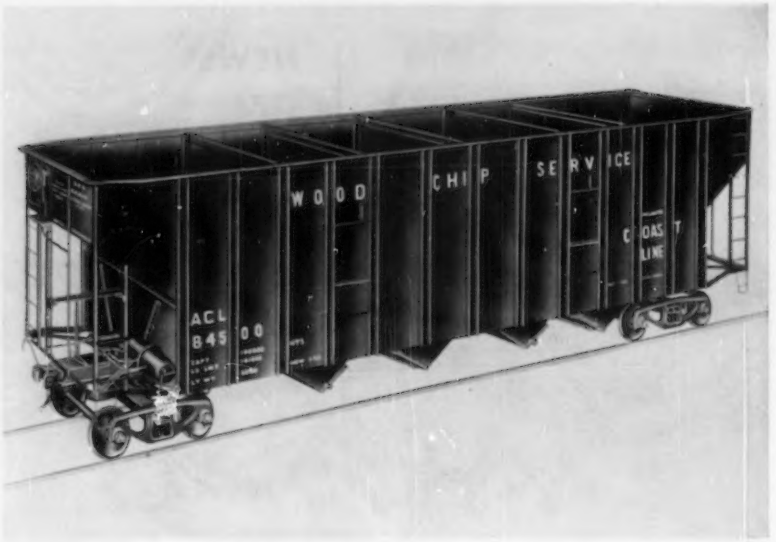
E. L. Mills

R. P. Sayers

Link-Belt Co., Duluth office, has appointed E. L. Mills district manager, replacing R. P. Sayers, who is being advanced to the Chicago district sales office, the company's largest.

Mr. Mills comes to Duluth from Pittsburgh where he has been district sales engineer since 1954. He has been with Link-Belt Co. since his graduation as a mechanical engineer from Purdue University in 1948 when he joined the drafting department of the company's Pershing Road plant in Chicago. He was employed as a research engineer in the material handling laboratory and in the engineering department before being transferred to Pittsburgh.

Mr. Sayers has been with Link-Belt Co. since 1933 and has been engaged in the shop, engineering and sales departments of the company's Pershing Road plant and as a district sales engineer in the Chicago district. He received his engineering degree from the University of Alabama and also studied at Northwestern University and the University of Illinois. He was appointed district manager of Duluth in 1956.



Atlantic Coast Line Railroad announces that, after many months of extensive tests to determine the most practical wood chip car for rail service to the pulp and paper industry, 200 giant-sized open top hopper cars of a completely new design will be built in the railroad's Waycross (Georgia) shops.

Production will begin in late January 1959 at rate of 20 to 25 cars per month. The first of the new cars will be placed in service in February, and will be devoted exclusively to the transportation of wood chips from various sources of supply to paper mills throughout the Southeast.

This freight car design is said to provide the paper industry with the newest, largest, most practical, and the first open top wood chip hopper car of its capacity in the country. These cars are giant-sized. They are more than 15 feet high, 50 feet in length, and have a capacity of 5400 cubic feet—about twice that of a conventional hopper car. This means that there will be a substantial saving in loading, unloading and switching time, as each car will handle the equivalent of 28 to 30 units of wood chips, weighing 70 tons. The design of these cars will enable the various paper plants to use their existing hopper facilities, with either the overhead or side type car shakers, for unloading.

Walworth Co. announces that Sidney A. Lewis has been appointed manager of technical sales service. In this capacity, Mr. Lewis will be responsible for the activities of the technical sales service group, whose members are specialists in marketing a particular product or of a group of products within a particular industry. The group is also liaison between sales and other departments of the company.

Mr. Lewis will also be manager of bronze valves sales. He joined Walworth in 1955 as manager, plastic division sales in which he supervised the engineering and sales of the company's line of rigid polyvinyl chloride valves and fittings.

Allis-Chalmers Manufacturing Co. has appointed S. B. Lamica manager of the Jacksonville, Florida, district. He succeeds J. T. Graham, who has been named supervisor of sales training for with headquarters in Milwaukee.

Mr. Lamica had been a sales representative in Allis-Chalmers Tampa district since 1952. He is a graduate electrical engineer of Rensselaer Polytechnic Institute.

Frank Nerney

Becco Chemical Division, Food Machinery and Chemical Corporation, has created a new southeastern sales territory comprising the states of Georgia, Alabama, Mississippi, the central part of Tennessee, and Northern Florida, and has promoted Frank Nerney to be manager of the new territory. The new territory will be separate from the existing Becco southern sales territory now covered from Charlotte, North Carolina, of which D. Stewart Quern is manager.

Mr. Nerney, a graduate of Lowell Textile Institute, started with Becco in 1938 as a research chemist. He was transferred to the sales department in 1949, and eight years later, in 1957, he was appointed technical assistant to

the southern sales manager. It is from this position that he has now been promoted to manager of the new southeastern sales territory. He will make his headquarters in Atlanta, Georgia.

G. E. Brien

Bailey Meter Co., Cleveland, Ohio, has appointed G. E. Brien resident engineer in New Haven, Conn., subdivision of the New York district. For the past several years his territory has included the State of Connecticut. Brien's address is P. O. Box 4074, Hamden 14, Conn.

On the New York staff since 1934, Mr. Brien worked out of the Boston office in the early 1930's. He joined Bailey Meter as a 1930 cadet engineer following his graduation from the University of New Hampshire. His professional activities include membership in the National Association of Power Engineers.

The Ohio Injector Co. has opened branch warehouses at Houston and Los Angeles to serve the distributors of its industrial valves in the territories extending from the Gulf Coast through the entire western states areas, G. Richard Winder, vice president marketing, announced.

The Los Angeles facility is located at 3045 E. 12th St. and will be managed by W. E. McComas of Los Angeles, Dennis P. Gordon, division sales manager, announced. Mr. McComas is widely known throughout the valve industry in the western states.

The Houston operation at 2822 Canal St. will be managed by J. E. Marrin, E. G. Blaylock.

The move in placing its own distribution facilities in "these growing centers of the petroleum, chemical and utility industries is in line with the company's concentration closer to marketing points," Roger E. Bremer, executive vice president in Wadsworth, said.

Interchemical Corp. A central headquarters for basic research, consultation and information in the field of color has been established by this firm.

Director of the Center is F. L. Wurzburg, Jr., who has been associated with color for 25 years. The Center is located at Interchemical's Central Research Laboratories at 432 West 45th Street in New York City where existing color facilities have been renovated and improved for the unit.

PRICES OF FIBERS

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FOURTH QUARTER CONTRACT PRICES PER SHORT AIR-DRY TON

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	U.S.	Canadian	Swedish	Finnish	Norwegian
Groundwood	$ 82.50/ 90.00	$ 82.50/ 90.00	§$90.00/ —	§$80.00/ —	§$90.00/ —
Bleached Gw'd	$ 97.50/100.00	$ 97.50/100.00			
Kraft, Blchd.	157.00/ —	160.00/162.50	$157.00/162.50*		$157.50/ —
Kraft, Blchd. Hdwd.	152.00/ —		$137.00/ —		
Kraft, Semi-bleached	140.00/ —	140.00/ —			
Kraft, Unbl.	117.50/125.00	125.00/130.00	†125.00/130.00	125.00/ —	
Sulphite, Blchd.	155.00/ —	155.00/ —	*155.00/ —	*155.00/ —	155.00/ —
Sulphite, Bl. Hdwd.	150.00/ —				
Sulphite, Unblchd	135.00/ —	135.00/ —	†135.00/ —	*135.00/ —	
Sulphite, Unb'l. Gl'sn		134.00/ —	†134.00/ —		
Soda, Blchd.	147.00/150.00	150.00/ —			

§ On Dock Atlantic Ports. * Freight allowed. † Varying Freight Allowances

COTTON LINTERS

F.O.B. OIL MILLS
WEEK ENDED DEC. 9

	Atlanta	Memphis	Dallas	Los Angeles
Grade 1	n.a.	n.a.	n.a.	n.a.
2	n.a.	n.a.	$8.75/7.50	7.50/7.25
3	$8.00/7.00	$7.75/6.00	7.25/6.75	7.00/6.75
4	7.00/5.75	5.75/5.50	6.25/5.75	6.50/6.00
5	5.75/5.00	5.00/4.75	5.50/5.00	5.50/5.00
6	5.00/4.00	4.25/4.00	4.50/4.25	4.50/4.00
7	4.00/3.00	3.50/3.25	4.00/3.00	3.00/2.50

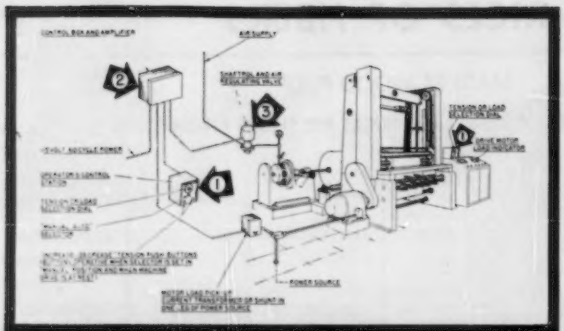
WASTE PAPER MARKET

Mill Prices, f.o.b. Trucks Shipping Point — Includes Brokerage

These quotations are a partial indication of the price range on volume tonnage in each market on the date specified, as gathered from major dealers and brokers. SPECIAL PACKINGS AND SPOT TONNAGE NOT INCLUDED. Prices nominal.

	New York	Boston	Chicago	Los Angeles
	Dec. 22	Dec. 22	Dec.	Dec.
No. 1 Mixed Paper	$10.00/ 11.00	8.00/ 10.00	9.00/ —	14.00/ 15.00
No. 1 News	14.00/ 15.00	15.00/ —	22.00/ —	17.00/ 18.00
Overissue News (Lg. size)	16.00/ 18.00	12.00/ 14.00	25.00/ —	22.00/ —
Mill Wrappers	19.00/ 22.00	13.00/ 15.00	12.00/ —	15.00/ —
Old Corrugated Containers	24.00/ 25.00	23.50/ 24.00	25.00/ —	25.00/ —
Super Resorted Kraft Paper	35.00/ 40.00	35.00/ 40.00	35.00/ —	55.00/ 57.50
New Double Kr. Ld. Corr. Cuts	35.00/ 37.50	37.50/ —	37.50/ —	35.00/ 37.00
(Semi-chem. medium)	47.50/ 50.00	45.00/ 50.00	45.00/ 50.00	35.00/ 36.00
New 100% Kraft Corr. Cuts	40.00/ 42.50	50.00/ 55.00	57.50/ —	— / —
New Br. Kraft, Env. Cuts	70.00/ 75.00	70.00/ 75.00	52.50/ —	55.00/ 57.00
New Br. Kr. Bag Waste Prntd.	55.00/ 60.00	55.00/ 60.00	52.50/ —	55.00/ 58.00
New Br. Kr. Bag Waste Unprintd	60.00/ 65.00	65.00/ 75.00	62.50/ —	58.00/ 60.00
No. 1 Groundwood Shvs.	25.00/ 30.00	22.50/ 27.50	22.00/ —	35.00/ 42.00
White Newsblanks	60.00/ 65.00	50.00/ 57.50	45.00/ —	55.00/ —
No. 1 Soft White Shvs.	60.00/ 65.00	60.00/ 65.00	55.00/ —	67.00/ 70.00
Super Soft White Shvs.	65.00/ 75.00	75.00/ 85.00	65.00/ —	— / —
Hd. White Shvs.	90.00/ 95.00	95.00/105.00	85.00/ —	95.00/ 97.00
Hd. White Env. Cuts	105.00/110.00	110.00/115.00	90.00/ —	113.00/ —
Col. Tab. Cards	55.00/ 60.00	60.00/ 67.00	52.50/ —	38.00/ 42.00
Manila Tab. Cards	75.00/ 80.00	75.00/ 85.00	75.00/ —	65.00/ —
No. 1 Col. Ledger	32.50/ 37.50	25.00/ 30.00	45.00/ —	29.00/ 35.00
White Ledger	60.00/ 62.50	57.50/ 62.50	57.50/ —	50.00/ 55.00
Mixed Book & Mag.†	20.00/ 23.00	18.00/ 20.00	14.50/ —	— / —
No. 1 Books‡	25.00/ 30.00	20.00/ 22.00	32.50/ —	14.50/ —

† Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% of groundwood.



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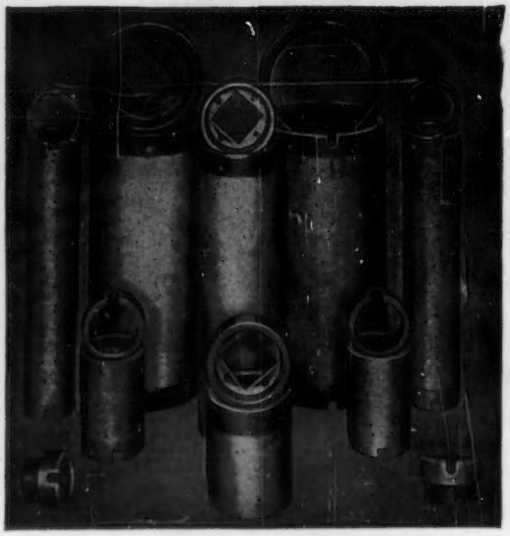

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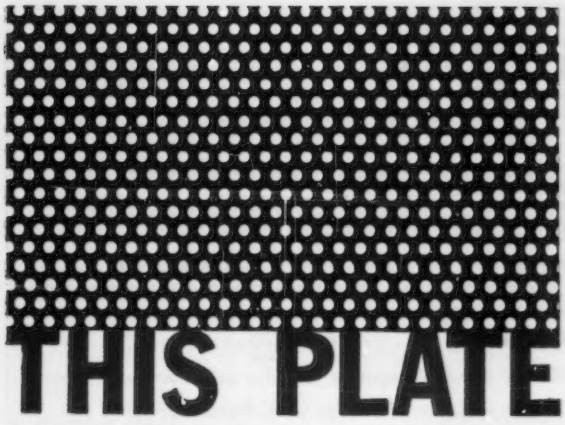

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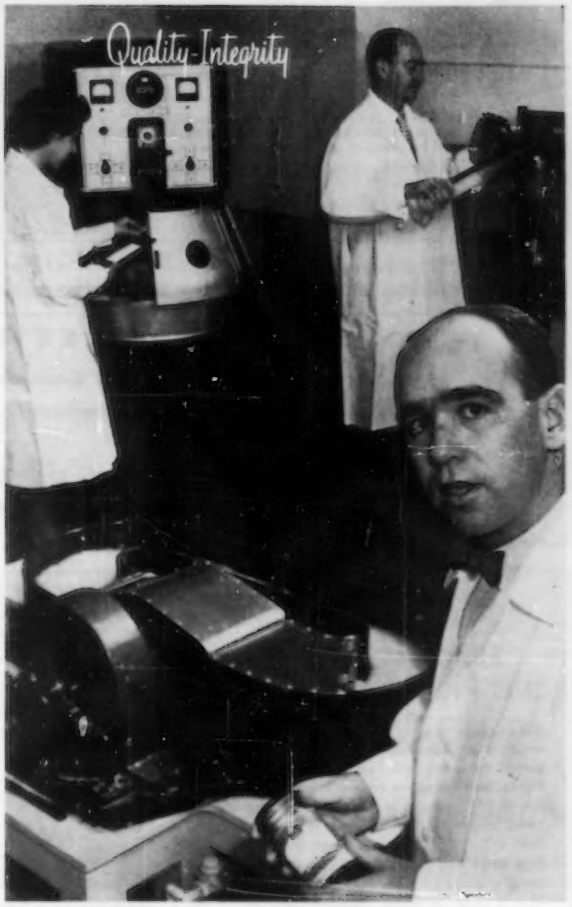

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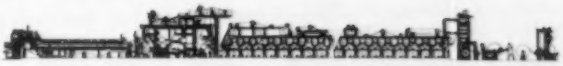

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599-8

PAPER TRADE JOURNAL CLEARING HOUSE

HELP WANTED—$1.25 a line. Minimum charge $5.00.
SITUATIONS WANTED—$1.25 a line. Minimum charge $5.00. If repeated ½ rate will be charged for each consecutive repetition.
FOR SALE—$1.25 a line. Minimum charge $5.00.
WANTED—$1.25 a line. Minimum charge $5.00.
OPPORTUNITIES—$1.25 a line. Minimum charge $5.00.

Classified advertising space may also be purchased at $7.00 per single column inch. All classified advertisements are payable in advance.
If box number is used—75 cents additional
Address replies to advertisements appearing under Box Number in care of PAPER TRADE JOURNAL, 49 West 45th Street, New York 19, N. Y.

Help Wanted | Help Wanted | Help Wanted

SALES MANAGER

Eastern mill manufacturing fine papers and specialties requires a mature man to organize sales into an energetic and efficient organization. Splendid opportunity for a man who can get things done. State experience and salary range in confidence.

CHARLES P. RAYMOND SERVICE, Inc.

294 Washington St. Phone Liberty 2-6547 Boston 8, Mass.

D-29

PAPER MEN

$5,000 to $50,000

SALES • PRODUCTION • TECHNICAL

Finding and landing **THE ONE BEST JOB** requires sound analysis, careful planning, proper contacts and skillful negotiation. Paper men ourselves, and the only specialists in the world in our particular field, we assist responsible paper men to accelerate their careers by uncovering and developing **THE SPECIFIC SITUATION** that most exactly fits the needs of each individual we serve. If you seek to better yourself, and your performance to date entitles you to our endorsement, we can and will help you. Contact us in absolute confidence for information regarding procedure.

GEO. M. SUNDAY & ASSO.

PAPER PERSONNEL CONSULTANTS

6 E. Monroe Chicago ANdover 3-1970

ENGINEERS

Excellent career opportunities for graduate mechanical engineers at our International Falls, Minnesota plant. Two to five years experience in paper mill or related work desirable. These positions also offer extensive medical coverage, a retirement program and life insurance benefits all paid for by the company.

Your reply giving personal, educational and work backgrounds will be kept in strict confidence.

Write Don Lindert, Minnesota and Ontario Paper Co., 500 Investors Bldg., Minneapolis 2, Minn. J-5

GENERAL MILL SUPERINTENDENT OR PRODUCTION MANAGER

With experience in fine Printing Papers and specialties—Middle Atlantic location—attractive salary—applications strictly confidential.

Address Box 58-329 care Paper Trade Journal. F-2

BETTER POSITIONS

$6000 to $35,000. Want a substantial salary increase, more opportunity or different location? This national 48 year old service connects you with best openings. You pay us only nominal fee for negotiations; This we refund when employer pays placement fee. Present position protected. In complete confidence, write for particulars. R. W. Bixby, Inc., 563 Brisbane Bldg., Buffalo 3, N. Y. D-29

WANTED

Recent graduate with science or engineering degree and few years experience in paper industry. We present a challenging opportunity to work with all phases of paper manufacture and conversion. As part of the research team of a leading supplier to the industry, the man who fills this newly created position will evaluate new products, supervise field testing and generally advise with management with respect to his field.

If you have a feel for the needs of the paper industry and would like to apply your ingenuity and imagineering in an Eastern laboratory write us in strictest confidence. Please give full details and desires in first letter, so that an interview may be arranged. Address Box 58-321 care Paper Trade Journal. J-5

MASTER MECHANIC

2 machine news mill in Northeastern U.S.A. seeks competent Master Mechanic. Must be fully experienced. Send full data and past records to Box 58-330 care Paper Trade Journal. All replies held in strict confidence. J-5

PAPER CONVERTING MACHINERY DESIGNER

Wanted by manufacturer of paper and film bag machinery and printing presses.

Located in pleasant New Jersey community.

Degree not necessary—only the ability and practical background for independent design of converting machinery.

Excellent opportunity for capable man. Salary open.

Please send resume of experience. Box 58-13 care Paper Trade Journal. TF

WANTED

TWO INDUSTRIAL GRADUATE ELECTRICAL ENGINEERS TO WORK UNDER CHIEF ELECTRICAL ENGINEER IN LARGE PULP AND PAPER MILL. YOUNG MEN WITH SOME EXPERIENCE IN AC AND DC ROTATING MACHINES AND CONTROL, SECTIONAL PAPER MACHINE DRIVES, MERCURY ARC RECTIFIERS AND ELECTRONICS CONTROL. SALARY OPEN. ADDRESS BOX 58-335 CARE PAPER TRADE JOURNAL J-19

ASST. SUPERINTENDENT

Are you interested in a challenging opportunity with an excellent future? We want a man with real ability, age 35-45 who is thoroughly familiar with the manufacture of lightweight Fourdrinier Specialty Papers. Paper School Graduate preferred. New York Vicinity. State full background and experience. All replies confidential. Reply box 58-320 care Paper Trade Journal. D-15

ROSS PAPER MACHINERY CO.

USED PAPER MAKING AND CONVERTING MACHINERY

265 PASSAIC STREET · NEWARK 4, NEW JERSEY · Humboldt 2-2177

Cable Address: JACKROSS Newark, N.J.

QUALITY GUARANTEED MACHINERY ERECTED FOR YOUR INSPECTION

BEATERS—CAST IRON TUBS
1— 25 lb Valley Iron Works
1— 750 lb Valley Iron Works; 38" x 48" roll.
6—1500 lb Dilts; 50" x 52" bandless rolls

BIRD DIRTECS
21—Bronze 6" primaries & 2" secondaries.

CALENDER STACKS
1— 82" Lobdell 5 roll.
1— 86" Lobdell 5 roll.
1— 86" P & J 7 roll
2—115" B-C 7 roll.
1—124" B-C 5 roll
1—124" B-C 6 roll
1—128" Downingtown 7 roll

CHIPPERS
1—96" Murray 6 knife; A-F Brng.

CONVERTING MACHINERY
1—2 ft. x 3 ft. Seybold Die Press
1—27" Laboratory Coater.
4—30" Thermo Pressure Sealing Machines
1—36" Printed Web Gillis Dryer
1—42" Knowlton Core Cutter
1—60" Knowlton Tube Roller
1—72" Hudson Sharp Laminator

CYLINDER MOLDS
2— 63" face x 36" dia w/rubber couches
1— 72" face x 48" dia
1— 73" face x 48" dia
1— 92" face x 30" dia
1—102" face x 36" dia
2—104" face x 36" dia
1—107" face x 48" dia; A-F Brng
2—111" face x 36" dia; A-F Brng
1—132" face x 36" dia; A-F Brng
1—132" face x 42" dia; A-F Brng
1—136" face x 54" dia; SS covering

DRYERS—HYDROSTATICALLY TESTED
16" Dia.: 2—46" face w/Accessories.
18" Dia.: 1—90" face w/A-F Brng.
24" Dia.: 39—46" face; Chrome plated.
28" Dia.:
3—70" face w/gears & bearings
3—71" face w/gears & bearings.
3—76" face w/gears & bearings.
3—77" face w/gears & bearings.
2—84" face.
2—160" face w/rope carriers.
36" Dia.:
1—42" face.
2—44" face.
2—46" face.
4—70" face w/gears & bearings.
11—72" face w/gears & bearings.
1—74" face Lukenweld w/A-F Brng.
1—74" face w/gears & bearings.
3—75" face w/gears & bearings.
9—76" face w/gears & bearings.
1—77" face w/gears & bearings.
1—78" face w/gears & bearings.
2—80" face.
5—84" face.
1—92" face.
1—138" face.
10—160" face.
42" Dia.:
20—78" face; complete section
1—106" face
1—110" face.
1—120" face.
1—160" face.
48" Dia.:
58—46" face; chrome plated.
1—52" face w/gears & bearings.
1—82" face w/gears & bearings.
5—90" face w/gears & bearings.
4—94" face
10—100" face w/bearings.
25—110" face w/frames & bearings.
12—123" face w/gears, frames & bearings.
1—128" face.
1—130" face.
14—160" face.
60" Dia.:
2—118" face.

CYLINDER WET ENDS
1— 99" face x 48" dia Downingtown single cylinder; 18" dia couch
1—132" face x 36" dia Beloit seven cylinder; 18" dia couches & four sets of presses

DRIVES
Various 2 hp thru 150 hp; all types.

EMBOSSERS
1—80" Hudson Sharp; A-F Brng

EXTRACTOR ROLL
1—134" face x 24" dia Downingtown w/18" dia rubber coach

FILTERS—STEEL VATS
1— 6' face x 3' dia Dorr-Oliver
1—10' face x 8' dia Dorr-Oliver continuous
3—14' face x 8' dia Oliver Kraft Stock Washers

FLAT SCREENS
1—10 Plate IMPCO w/dunbar drive & bronze vat
2—12 Plate IMPCO w/braemer controls
1—14 Plate Sandy Hill Packer

FOURDRINIER WET END
1—106" Valley complete from head box through 22" dia. suction couch.

JORDANS
1—Appleton #2 w/A-F Brng & SS filling
1—Smith & Winchester w/granite filling
1—Jones #4 Imperial w/A-F Brng & SS filling
2—Appleton #1 w/A-F Brng.

MOTORS—3 PH. 60 CYCLE
1—100 hp GE; 440 v; 695 rpm
2—100 hp GE; 440 v; 430 rpm
1—350 hp GE; 2200 v; 720 rpm; Synch

PUMPS
Various open & inclosed impellor centrifugal

REELS
1— 86" Downingtown two bowl
1— 94" Downingtown two bowl; 60" dia rolls
1—100" Kohler automatic two arm unwind reel; 60" dia rolls; new condition
1—150" B & S pope type w/Reliance drive

REFINERS
2—#1 Claflin; A-F Brng
1—#1 Dilts Hydrafiner w/motor & S.S. filling
1—24" Downingtown Weiner; new
1—F24 Bauer w/50 hp motor

ROLLS—PRESS, COUCH, CALENDER, ETC.
Various rolls of all types and sizes

ROLL GRINDERS—COMPLETE W/MOTORS
1—208" x 32" Farrel w/crowning device.

ROTARY SCREENS—BIRD
12—#3A, Model 100 w/SS or copper vats

SHEETERS—DOUBLE KNIFE
1—64" Dillon
1—80" B-C heavy duty board model
1—87" Hamblet w/backstand & layboy
1—157" Masson-Scott; like new

SHEETERS—SINGLE KNIFE
1—36" Beck w/layboy & Elec. Eye
1—60" Hamblet w/layboy & backstand
1—63" Hamblet
1—65" Hamblet w/backstand & layboy
1—65" Kidder w/elec. eye and layboy
1—67" Hamblet
1—71" Hamblet
1—82" Hamblet w/layboy & backstand
1—100" Hamblet w/3 pile layboy
1—105" Hamblet w/backstand & motor
1—110" Hamblet
1—124" Cameron quick change slitter assembly

SLITTERS & WINDERS
3— 12" Schultz Types AS & LDX
1— 40" Fales Model B; 18" dia rewind
1— 42" Essex duplex; 30" dia rewind
4—42" Cameron Model 6; 24" dia rewind
1— 42" Cameron Model 40-1A; 22" dia rewind
2—48" Langston duplex; 24" dia rewind
1—50" Cameron Model 6; 24" dia rewind
1— 52" Cameron Model 24-2A; 18" dia rewind
1— 60" Hudson-Sharp; plastic coated paper
1— 60" Langston; shear cut; 30" dia rewind
1— 60" Kidder Model SH; 40" dia rewind
1—62" Cameron Model 9-5; 24" dia rewind
3— 62" Cameron Model 6; 24" dia rewind
1—62" Cameron Model 8; heavy duty
1—62" Cameron Model 6; 30" dia rewind
1— 62" Cameron Model 6; new 1951; 24" dia re.
1— 64" Cameron Model 8; 36" dia rewind
1—64" Johnstone Type 5—duplex
1—70" Center Winder w/variable speed motor.
1— 72" Cameron Model 26-3A duplex.
1— 72" Beloit shear cut; 40" dia rewind
1— 72" Hudson-Sharp high speed automatic
1—82" Langston Shear cut; 50" dia rewind
1—86" Cameron Model 8-10; 48" dia. rewind
1—110" Cameron Model 18; 60" dia rewind
1—124" Cameron quick change slitter assembly
1—148" Langston shear cut; A-F Brng; 60" dia rewind
1—194" Cameron Model 19; A-F Brng

STEAM TURBINE—PAPER MACHINE DRIVE
1—100 hp DeLaval w/reducer

SUCTION COUCH ROLLS
1—108" drilled face x 22" dia Sandusky
1—116" drilled face x 18" dia Sandusky
1—122" drilled face x 18" dia Sandusky
1—122" drilled face x 25" dia Sandusky
1—135" drilled face x 22" dia Sandusky
1—192" drilled face x 30" dia Millspaugh

SUCTION PRESS ROLLS
1— 90" drilled face x 18" dia Sandusky
1— 98" drilled face x 18" dia Sandusky
1—166" drilled face x 19" dia Millspaugh; used 2 mos; A.-F. Brng; rubber covered.
1—194" drilled face x 30" dia Millspaugh

SUPERCALENDERS
2—30" Norwood 4 roll
1—63" Norwood 8 roll; A-F Brng.
1—65" Norwood 8 roll; A-F Brng.
1—92" Norwood 7 roll w/drive

THICKENERS
1— 92" face x 36" dia cyl w/rubber couch; less vat
6—132" face x 36" dia cyl w/16" dia rubber couches; A-F Brng
1—132" face x 42" dia cyl w/16" dia rubber couch; A-F Brng

TRIMMERS—POWER BACK GAUGES
1—56" Seybold Dayton
1—74" Seybold 20th Century
1—84" Seybold 12Z
1—84" Seybold Dayton w/motor
1—94" Seybold Precision w/motor & air table

VACUUM PUMPS
2—H-4 Nash w/10 hp motors
1—L-4 Nash
1—L-5 Nash
1—H-5 Nash w/motor
1—H-8 Nash
1—#3 Nash w/25 hp motor
4—#2, #3 & #6 Nash Hytors
1—7 x 10 Connersville

VOITH INLETS
2— 86" Valley Iron Works
1—102" Valley Iron Works
1—144" B & S high speed w/headbox; SS clad
1—156" New Valley w/36" headbox; monel lined

YANKEE DRYERS
2—118" face x 5' dia.
1—132" face x 10' dia Beloit; 35 psi
1—140" face x 12' dia Beloit; 75 psi

WAXERS & COATERS
1—54" Mayer w/motor
2—62" Mayer w/motors
1—65" Mayer w/drive
1—76" Mayer w/ Dowtherm system

Help Wanted

ELECTRICAL ENGINEER

2 machine news mill in Northeastern U.S.A. seeks competent Electrical Engineer. Must have minimum of 2 years experience. Send full data and past records to Box 58-331 care Paper Trade Journal. All replies held in strict confidence.

J-5

GENERAL SUPERINTENDENT

Groundwood specialty mill in Northeastern U.S.A. seeks competent General Superintendent. Must be experienced in all phases of groundwood specialties. Please submit detailed resume of experience, education and salary requirements. All replies held in strict confidence. Address Box 58-332 care Paper Trade Journal.

J-5

WANTED

Plant Engineer experienced in steam, electricity, maintenance and construction for a two machine non-integrated mill located in Lake States. Please give full details. All replies will be held in confidence. Box 58-328 care Paper Trade Journal.

J-12

WANTED

Young recent graduate in science or engineering with a few years experience in pulp and paper manufacture for interesting job in New York City office. Replies treated in greatest confidence. Please write Box 58-267 Paper Trade Journal.

TF

MACHINE TENDER

For Fourdrinier machine running towel and napkin grade paper in our Bloomfield, N. J. plant. Must be willing to work rotating shift. Reply promptly stating details of age, experience, and wages expected to Box 58-325 care Paper Trade Journal.

J-5

Situations Wanted

Engineer Available

M.E. with 34 years experience in pulp, paper and board mills as Chief Engineer, Plant and Project Engineer. Qualified to supervise mechanical and electrical maintenance departments. Power plant operation. Layout, design, construction and installation. Well versed in labor relations with proven ability to supervise personnel. Address Box 58-301 care Paper Trade Journal.

D-29

YOUNG—WIDE FOURDRINIER SUPV. EXPERIENCED STOCK PREPARATION — DE-INKING AND COLOR MATCHING—BLEACHED SULPHITE SPECIALTIES. WANTS ADVANCEMENT TO HIGHER SUPERVISOR STATUS. ADDRESS BOX 58-315 CARE PAPER TRADE JOURNAL.

D-29

EXECUTIVE—Conversion of Boards and Papers. Currently Works Manager; desire change for challenging opportunity. Highly successful record in organization, production and development. Address Box 58-122 care Paper Trade Journal.

D-29

Wanted

WANTED

Squeeze Roll Waxing Machine. Potdevin or other manufacture — 60" or wider. Address Box 58-334 care Paper Trade Journal.

D-29

GOVERNMENT BIDS

PROPOSALS

FOR FURNISHING

Paper And Envelopes For The U. S. Government Printing Office

SEALED PROPOSALS will be received until 10 a. m. E. S. T., January 12, 1959, in the room of the Joint Committee on Printing, in the Capitol, Washington, D. C., for furnishing the paper for the public printing and binding, and blank paper and plain envelopes for the use of the Government departments and establishments in the District of Columbia, for the terms of 3 months for paper and 6 months for envelopes beginning February 1, 1959, deliveries to be f.o.b. Government Printing Office Warehouse, or warehouse siding, Washington, D. C. The proposals will be opened in the presence of and the award of contracts made by the Joint Committee on Printing to the lowest and best bidders for the interest of the Government whose bids are in conformity with the requirements of the proposals. The committee reserves the right to reject any or all bids, or to accept any bid or any part and reject the other part, if, in its opinion, such action would be in the interest of the Government.

Blank proposals containing the instructions, schedule, and specifications may be obtained by addressing Raymond Blattenberger, Public Printer, Washington, D. C.

Contracts will be entered into for supplying the quantities required, whether more or less than the estimates, as provided in paragraph 26 of the proposal for paper and paragraph 24 of the proposal for envelopes.

The approximate estimated quantities set forth in detail in the schedule comprise:

PAPER

1,955,000 pounds machine-finish book paper; 30,000 pounds machine-finish book end paper; 300,000 pounds special english-finish book paper; 80,000 pounds english-finish book paper; 10,199,000 pounds offset book paper; 170,000 pounds antique book paper; 210,000 pounds super-calendered book paper; 1,903,000 pounds coated book paper; 820,000 pounds mimeograph paper; 400,000 pounds duplicator copy paper; 860,000 pounds writing paper; 7,400,000 pounds writing paper for offset printing; 225,500 pounds map paper; 367,000 pounds manifold paper; 380,000 pounds bond paper; 1,442,000 pounds bond paper for offset printing; 9,000 pounds 100% bond paper for offset printing; 45,000 pounds translucent bond paper for offset printing; 820,000 pounds ledger paper for offset printing; 24,000 pounds 100% ledger paper for offset printing; 1,045,000 pounds index paper for offset printing; 45,000 pounds cream white index paper for offset printing; 295,000 pounds cover paper for offset printing; 25,000 pounds litho-coated cover paper; 5,000 sheets cloth-lined cover paper; 25,000 pounds manila paper; 245,000 pounds kraft paper; 485,000 sheets gummed paper; 45,000 pounds blotting paper; 8,000 pounds oiled manila tympan paper; 50,000 pounds manila tagboard; 10,000 pounds manila cardboard; 70,000 sheets railroad board; 20,000 pounds wood cardboard; 90,000 pounds tan board; 5,000 pounds wallet board; 10,000 pounds jute tag board; 3,610,000 pounds postal card paper; 10,000 pounds folding bristol; 55,000 sheets pressboard; 215,000 pounds newsboard;

240,000 {pounds binder's board. {pounds chestnut cover board.

ENVELOPES

The approximate estimated quantities set forth in detail in the schedule comprise:

33,375,000 kraft; 13,645,000 writing, chemical wood, white and colored; 100,000 writing, white 100%; 446,000 25% bond, white; 305,000 100% bond, white; 30,000 ledger, white.

By direction of the Joint Committee on Printing.

RAYMOND BLATTENBERGER,
Public Printer.

WASHINGTON, D. C.,
December 15, 1958.

J-5

BARGAINS

IMMEDIATE DELIVERY

1—128" B & S 10-Roll Calender Stack. King Roll 24" Dia. Heavy box frames, full set of doctors. Excellent Condition.
1—86" Farrel 8-Roll Calender Stack. Antifriction Bearings. Excellent Condition.
26—36" x 72" Complete Dryer Section, Stack, Drives, Etc.
10—48" x 150" Pusey & Jones Dryers.
1—84" Kamyr Machine, Complete. 75 ton per day output.
1—E. D. Jones Majestic Jordon No. A-482. New S.S. Fillings. Like New.
1—E. D. Jones Imperial Jordon, S.S. Fillings
1—Noble & Wood Mammoth Jr. Jordon, S.S. Fillings
1—Monarch Jordon, Model SP, Serial #21095, no fillings. Direct connected to a 75 H.P. G.E. 400 RPM Motor.
1—No. 3 Jones Pulpmaster, Late Type. Complete Drive.
1—No. 1 Jones Refiner. Direct connected to 100 H.P. d.p. S. S. 440 Volt Motor.
1—A.P.P. Rotary Centrifugal Pulp Screen, 40" Dia. x 42" Face. Serial #1274227. Like new. Capable of 40 ton groundwood pulp per day.
1—Trimbey Senior Rotary Screen.
2—Impco Rotary Pulp Screens.
3—No. 3 Impco Rotary Knotter Screens. S.S. Plates.
1—110" Pusey & Jones 2-Drum Winder. A.F. Bearings.
1—Hudson Sharpe Toilet Tissue Converting Machine. Ser. #2123. 8 Spare Mandrel Bars.
1—42" Dia. x 110" Face Pope Type Reel. Excellent Condition.
1—25" Dia. x 156" Face Sandusky Suction Couch. Bearings & Stands.
1—22" Dia. x 138" Perforated Face Sandusky Suction Couch, Bearings & Stands.
1—10-Knife Carthage Chipper with Antifriction Bearings.
1—54" Dia. x 48" Face Valley Iron Tub Beater.
1—Ditts 52" Dia. x 40" Face—2000 lb. Iron Tub Beater. S.S. Extractor Type Hood.
1—Seybold Knife Grinder. Size G. 84" Table. Serial #4X802.
1—Sandy Hill Sulphur Burner. Complete.
2—#2 Bird Screens with Copper Vats & S.S. Plates.
—Tugboat Annie Pulper.
1—Worthington Air Compressor, Model 5TR2, 2-Stage, Air Cooled. 5 H.P.
1—C.P. 12 x 10 Air Compressor, 100# Pressure.
1—I.R. 7 x 7 Air Compressor. 100# Pressure.
1—No. 244 Mattison 18" Core Cutting Saw —5 H.P. 3450 RPM, 3/60/220-440 volt.
1—90 H.P. Terry Turbine, Type G-4000/1000 RPM. For Paper Machine Drive. Complete.
1—No. 2 Jones Pulper. A.F. Bearings. Spare Worm.
1—36" Putman H.D. Lathe—15' Centers.
1—24" x 6' L & S Geared Head, H.D. Machine Lathe. Taper Attachment, Hollow Spindle, Motorized.
1—350 H.P. G.E. 2200 Volt, 450 RPM Motor with G.E. 350 H.P. 2200 Volt, Type CR7065-MS Controller.
1—A.C. 75 H.P. 3/60/220-440 Volt, 720 RPM. T.E.F.C. Type ARZX Motor.
1—A.C. 60 H.P. 3/60/220-440 Volt, 720 RPM. T.E.F.C. Type ARZX Motor.
1—G.E. 100 H.P. MG Set, 250 Volt D.C.
1—250 H.P. Ingersoll Rand Diesel Engine Generator Set—G.E. Generator, 150 KW, 480 Volts, 720 RPM.

Save over 50% on your requirements for New Jordon Fillings. S.S., Bronze & Carbon Steel.

Gear Reducers, P.I.V. Drives, Generators, B.B. Pumps, Stock Pumps, Plunger Pumps, Etc.

1000 Electric Motors from ¼ H.P. to 600 H.P. in Stock.

The above is but a small part of the inventory we carry. We can furnish you with almost anything in the line of paper mill, electrical and machine shop equipment.

Write—Wire—Phone For Your Needs

RUDERMAN MACHINERY EXCHANGE
GOUVERNEUR, NEW YORK
Telephone 333-334

TF

Wanted

WANTED

Will buy for cash—paper co. with tax loss over past three years. Strictly confidential. Box 58-333 care Paper Trade Journal. TF

Wanted

WANTED

Surplus Printing Papers. Job Lots, Seconds, Odd Sizes, Off Colors, Side Cuts, etc.
Send samples, sizes, price, etc.

Joseph G. Zifchock Pascoag, R. I.
J-19

For Sale

FOR SALE

1—102" Fourdriner, suction couch; 1 suction press; 1 plain press; 22 dryers, 48" dia., 98" face; 7 roll Calender stack; Pope type reel, Cameron 18 Winder. Enclosed Falk drives with Fawick clutches; line shafting; pumps, etc.

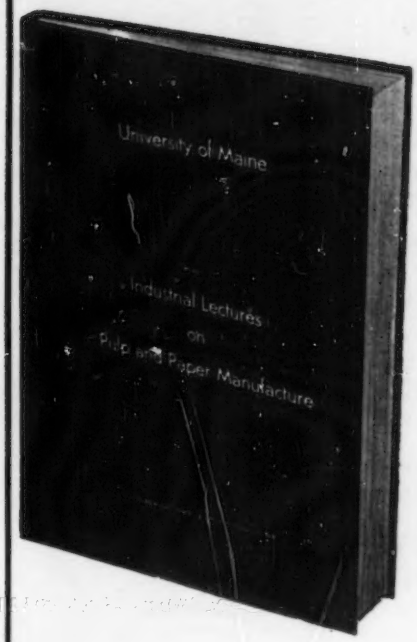
1—84" Fourdriner, 2 presses, 20 dryers 48" dia., 80" face; calender stack; Pope type reel; 2 drum Winder; drives; line shafting, etc.

1—74" Fourdriner, 2 presses; 26 dryers 36" dia., 72" face; calender stack; reel; winder and back drives.

1—Yankee Fourdriner 134" with Beloit Iron Works; dryer 10 ft. dia., 132" face complete and designed to run 750 f.p.m. Could be operated at 1000 f.p.m.

OSBORNE PAPER MILL EQUIPMENT CORP.

Fulton, N. Y. LY-2-4254
D-29



Industry Specialists Authored This Practical Textbook on Pulp & Paper Production . . .

University of Maine Professors Edited It.

University of Maine-Lectures on Pulp and Paper Manufacture (Series No. 2)

Edited by Professors Lyde Jenness and John Lewis, the 375 page book publishes a series of lectures given by industry experts at the University of Maine on a complete range of pulp and paper making subjects. The *lectures* can be used as a textbook to train foremen and to orient engineers entering the field. Executives, superintendents, engineers and chemists will find this book useful as a reference. Every mill should have one or more copies. Price: $5.00.

Lockwood Trade Journal Co., Inc.

49 West 45 Street **New York 36, New York**

FOR SALE
IMMEDIATE DELIVERY
LOCATED—PHILADELPHIA, PA.

1—90" Yankee Fourdrinier Machine. Equipped with Suction Press, Head Box, Voight Inlet.

1—6 Ft. Lukes Steel Yankee Dryer—150# Test.

1—5 Ft. Moore & White Yankee Dryer.
The above two dryers are fully equipped with doctors, Honeywell speed indicators and air cylinders with Foxboro controls. All rolls (felt & wire) equipped with A.F. Bearings. Direct Motor Drives. Excellent Condition.

2—Collators.

1—#1 Claflin Refiner.

1—75 KW MG Set with Controls.

2—Embossers.

3—Beaters.

2—Savealls.

Many other items, including pumps, motors, laboratory equipment, etc.

Write—Wire—Phone For Your Needs

RUDERMAN MACHINERY EXCHANGE
GOUVERNEUR, NEW YORK
Telephone 333-334 TF

***FOR SALE* Lynch Morpac Wrapping Machine—Model E**

Completely automatic. Will wrap packages 7½ x 5 x ¾ to 15 x 10 x 5 at high speed. Printing attachment included. This machine in perfect condition—Priced for quick sale.

General Offset Printing Co., Inc.
157 Chestnut Street Springfield, Mass.
D-29

COATING RODS FOR SALE

Equalizers, Mayer Rods, Metering Rods. Wire sizes #3 (.003) to #50 (.050). Music spring wire and stainless steel wire.

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Zima, J. J.—Newsprint Paper in 1957—46, Mar. 17.

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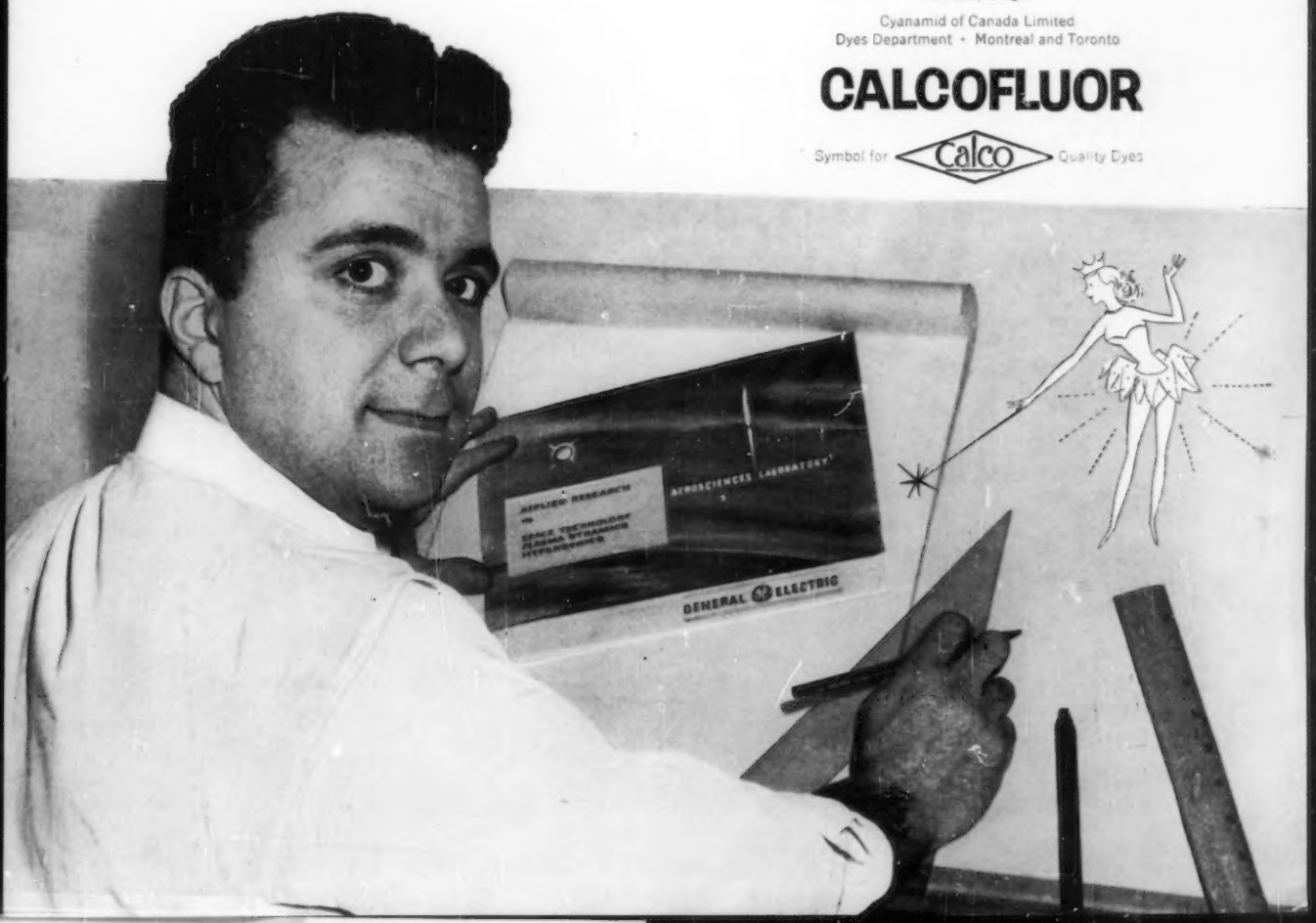

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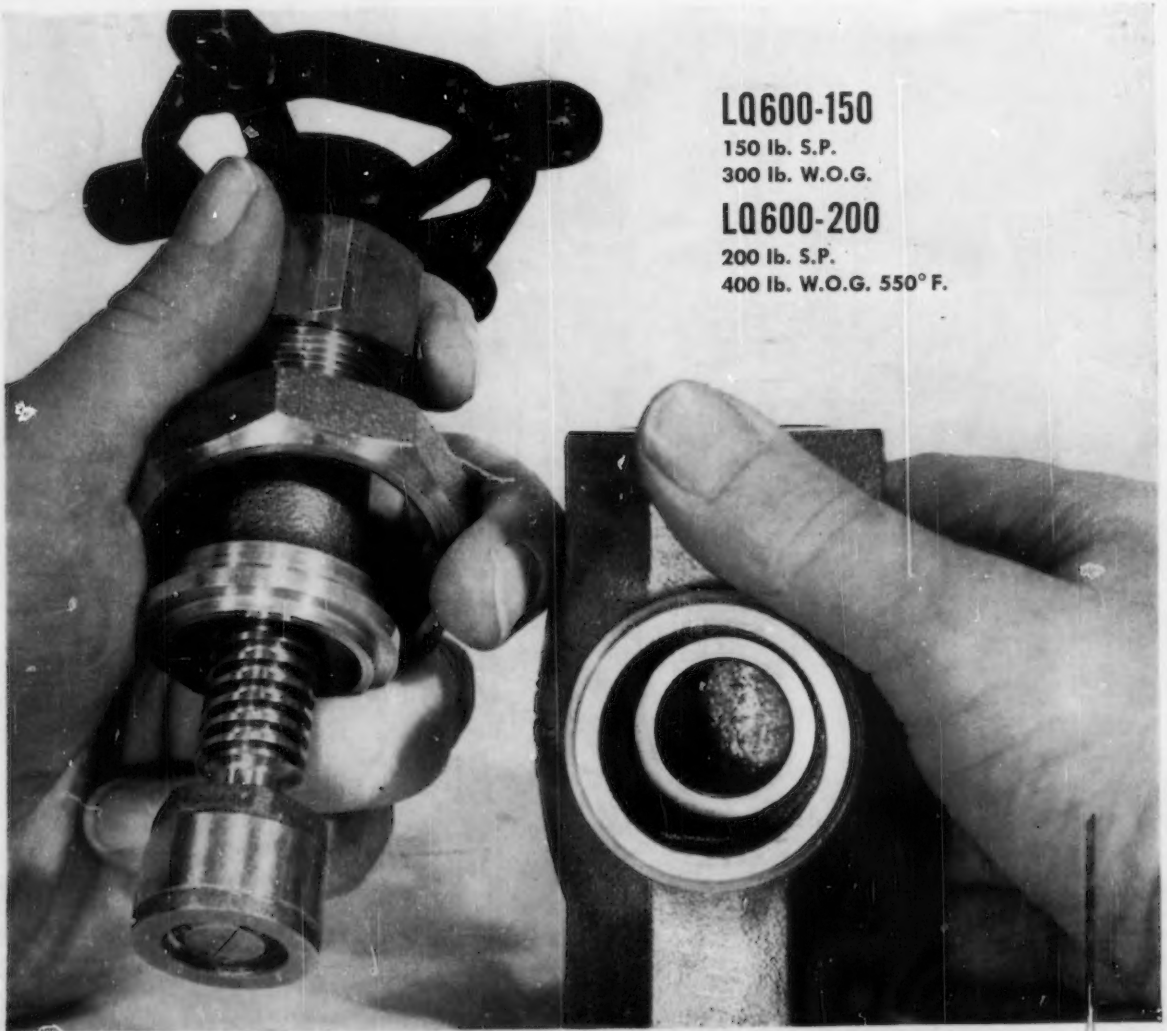

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